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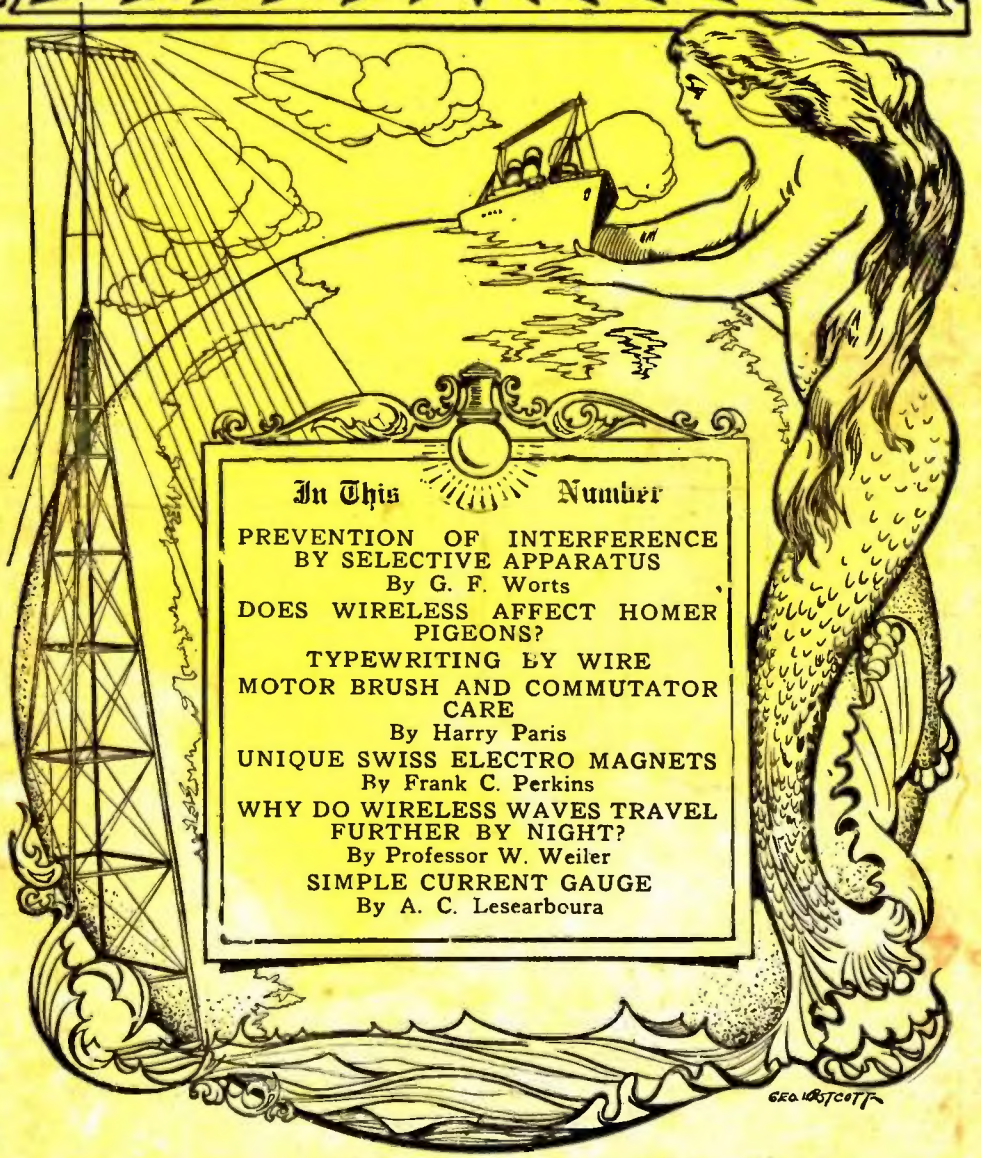
MODERN ELECTRICS



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THE SPIRIT OF WIRELESS

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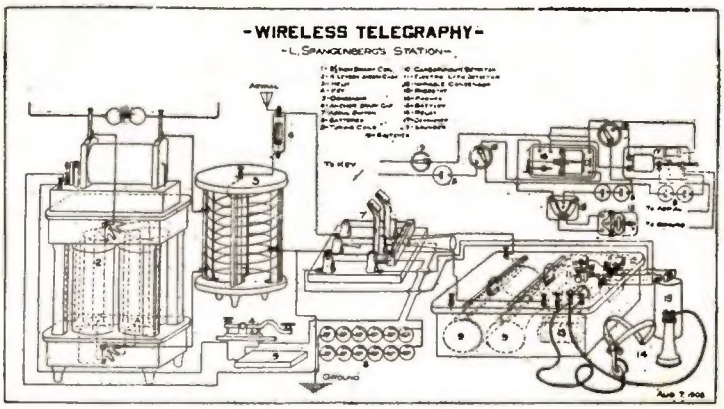

96 Pages CONTENTS **75 Illustrations**

How to make a loose coupler.
How to make a microphone detector.
How to make a simple antenna switch.
How to make a spark gap muffler.
How to make a 1000-ohm relay.
How to make a carborundum detector.
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How to make a selective tuner with weeding out circuit.
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VOL. III. NOVEMBER, 1910. No. 8

The Prevention of Interference by Selective Apparatus

By G. F. Worts.

PERHAPS the simplest solution to the present interference question is the use of properly designed apparatus. A properly tuned transmitter and a selective receptor such as the equally divided circuit type described in a following paragraph will assist materially in the reduction of "9", besides placing wireless on a more practical basis.

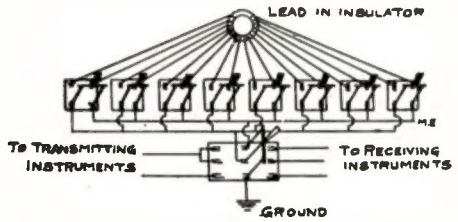


FIG. 1

Selectivity can be obtained probably by no better method than the proper manipulation of aerials. A four, eight, or sixteen sided umbrella aerial, with the sides formed into as many loops, can be used with selective results. Fig. 1 illustrates a method for obtaining directive effects with an eight looped umbrella aerial.

By the use of a number of double blade knife switches, which can be used to cut in various sides of the aerial, directive effects both as to sending and receiving can be obtained to various points of the compass. The loop back of each section should be about one fourth the length of the section itself to produce the best results.

The Transmitter.

Any device that will decrease the damping of the wave train will assist selectivity. The use of the rotating or high frequency spark is an aid to this as it permits of much sharper tuning. The quenched spark produced by means of a series spark gap and high frequency transmitting apparatus sends out a high musical note that can be quite easily read through interference and atmospheric disturbance. Skillful tuning of a common auto transformer or helix will result in fairly undamped waves. An iron cylinder raised or lowered in a helix, will by its choking effect aid to a certain extent in the production of an undamped wave. The loose coupled transmitting tuner or oscillation transformer is an aid in spark tuning. Dr. DeForest has used a transmitting variometer recently with success. The finest tuning is made possible by the use of this device.

One troublesome factor that will always enter potently in even the most selective receptors is the forced oscillation. The forced oscillation is the wave sent out from a local station and is un-

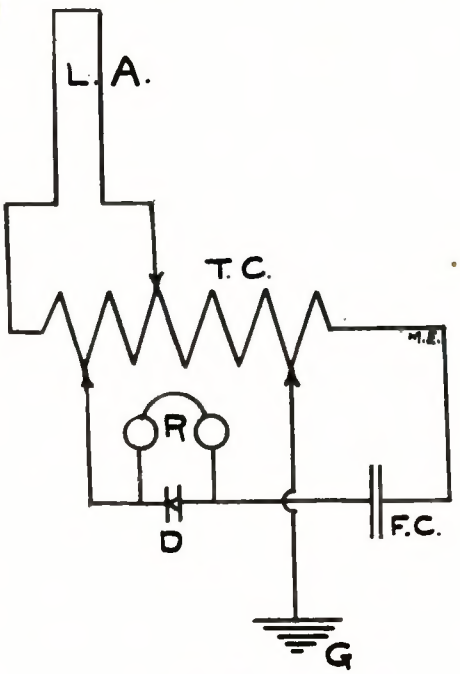


FIG. 2.

tunable on account of its nearness. It may be partially and almost wholly

worked through by the use of some receptors.

A simple hook up for tuning out short waves is shown in Fig. 2. The use of the variometer and loose coupler with a loop aerial and a single slide tuner,

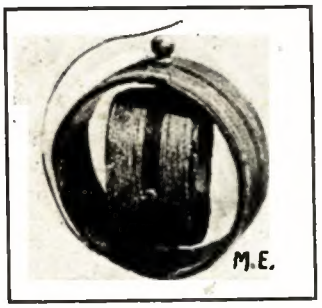


FIG. 3

shunted by a variable condenser as shown in Fig. 4, will produce very good results in selective tuning

A simple variometer, Fig. 3, may be placed in the ground circuit. In winding variometer, if stranded wire, such as lamp cord, is used the inductive effect obtained is much greater. If loose couplers are wound with two wires instead of one at a time greater variations in coupling and consequently greater selectivity will be made possible.

The circuit given in Fig. 4 will reduce to a minimum interference from stations using series spark gap transmitters.

To receive from these stations, disconnect the lead AB. The grounded coil will prove a static preventer to some extent.

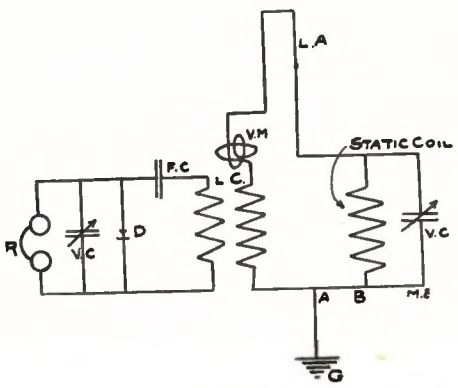


FIG. 4

One of the most effective tuning devices for static elimination will be found in Marconi's "X" static stopper, Fig. 5. It consists of a number of auto-transformers each in series with the one preceding and grounded on one slide through a variable condenser. The highly disruptive discharge of lightning is carried through the variable to the ground on each successive coil and very little reaches the detector.

Incoming signals are grounded to some extent, but in proportion not as much as the static. Marconi's new "hook up" which cuts down static and untuned waves very successfully, consists of two rectifying detectors connected in wo oscillatory circuits to the aerial.

The Marconi interference preventer is shown by Fig. 6. One of the circuits is in resonance with the waves to be received while the capacity of the other circuit is made slightly different. The capacities and couplings of both circuits are adjusted correctly so that the disturb-

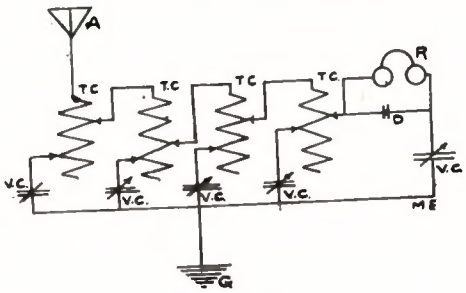


FIG. 5

ing influences will oppose and neutralize each other.

Fessenden's interference preventer which embodies the same principle, is much simpler in construction and operation and as it can be easily used by amateurs will be discussed fully here.

Fessenden's interference preventer is connected as shown in Fig. 7. The circuit ABC, is tuned to the desired wave and the circuit AB'C adjusted to 5% difference in capacity by means of rotary, calibrated condensers (the inductance and coupling in both circuits being practically the same). It is then connected across AC and the variometer adjusted till the desired signals come in the loudest. The interfering wave not being in tune with either side will go through ABC and AB'C approximately equally well. In the secondary circuit, the same as in the new Marconi hook up, the disturbing influences oppose and

neutralize each other. The desired wave goes mainly through ABC With this hook up Fessenden is said to have received signals 3,000 miles distant. while a 15 K. W. navy set was working. The circuit consists of a yariometer in the aerial lead and a variable capacity and variable coupling tuner in the opposing circuits. A fixed condenser, rectifying detector and head telephones are provided in the secondary circuit.

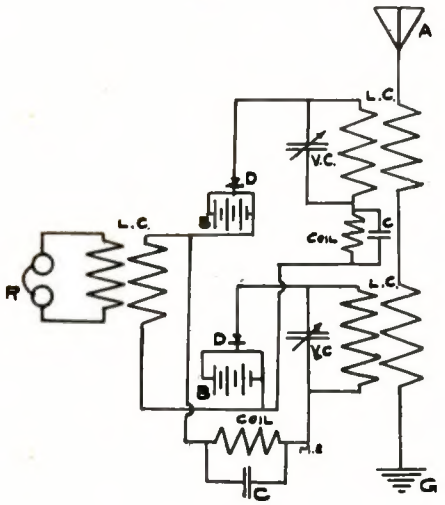


FIG. 6

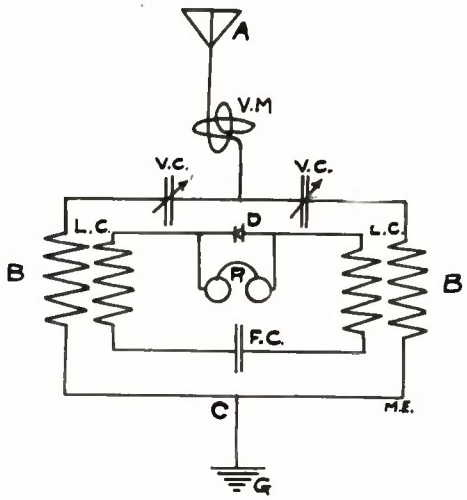


FIG. 7

WIRELESS NEWS FROM SAN FRANCISCO.

By W. Potter.

Wireless has entered into in the west with as much spirit, no doubt, as in the east. Many comercial companies have now established stations on the Pacific coast.

Among the professional sations now in San Francisco are, the United Wireless Company, who now have a big 15 K. W. station which talks daily with the Philippines, etc. DeForest has set up a new station in the heart of the city. Poulsen has erected at great expense two 500-ft. towers, and Massie also has a station in San Francisco. But there are also many wireless telephone companies, many of which are local inventions, some of which are: McCarthy, the Aerial Wireless Telephone Company and the Universal Telephone Company. Most of the vessels on the coast are equipped with powerful sets and are in constant touch with the shore.

The amateur stations are very numerous, and most of them are equipped with both sending and receiving, and many amateurs have coils with a rating all the way from ½ K. W. to 5 K. W. I have noticed that your suggestion has been followed closely out here and that nine-tenths of the amateurs have duplex aerials.

SUBMARINE WIRELESS.

The DI. which is the largest English submarine in the world, is the first vessel of its kind to be fitted with wireless telegraphy. Experiments have proved that wireless communication can be kept up between ordinary war-vessels and submarines running submerged, the submarines being able not only to receive messages while under water, but to answer them. Thus orders can be conveyed by wireless from flagships to submerged submarines or from one submerged submarine to another. The new wireless mast is rather less than twice the height of the periscope which is beside it. The apparatus is submerged as far as the periscope.

Does Wireless Affect Homer Pigeons?

The losses among homer pigeons, of which great numbers are flown at this season, have been heavier this autumn than ever before, and one good reason has been traced for the disappearances, says the London correspondent of a Chicago daily. The hawks, which decrease in number, and the guns, which are used less promiscuously than of old, do not account for enough victims.

The forces of heredity should tend to strengthen the perfection of the homing instinct, and the bird, like the skylark, is singularly true to the "kindred points of heaven and home." It is believed among some of those who race birds that an ethereal influence of a new sort has interrupted the instinctive knowledge that comes to homing birds.

The way of a bird in the air has ever been one of the mysteries. The swallow cannot see English caves when she launches herself across the Mediterranean. She does not guide herself by the sailor's stars, though flight is more often by night than day.

She has no landmarks that we can tell of, and little experience, since often the journey is led by the young. We must believe that some more subtle sense than sight or hearing beacons her viewless way above the lands and sea. The tide of her migrating at spirng and autumn has some strange communion with the change of seasons, and she hurries north or south in obedience to some feeling subconscious in the bird and untraceable by man.

Beyond all question birds have "a sixth sense." By a sixth sense is meant some means of determining direction, and perhaps date, through a medium alien to man.

The flights of homer pigeons are less wonderful, except in the matter of velocity, than the longer flights of migrant birds. The pigeons improve by experience, they grow surer by daily training, and seem always to get their first hint of direction by direct eyesight from the heights to which they tower on being "enlarged."

But they, too, have the migrant's gift, and, like the common wood pigeon, can travel truly over wide seas at the dictates of the season.

The mysterious, the nameless gift is theirs; and it is expressed in various ways. When collected we have a great mass of evidence, touching many sorts of like things, to prove that they are aware of influences to which men's dull sense are deaf or blind.

They do things imposible to the best equipped man; they fear things and they hope things from coming events of which neither we nor our instruments can detect the shadows.

Certain animals appear to be supersensitive to disturbing influences which may be electrical—that is, imparted through the ether like light—or atmospherical—that is, imparted through the air like sound. It has generally been held most likely that birds and some other animals are peculiarly sensitive to the air, can detect any slight change in the amount of moisture, or in the temperature, or in the weight, or even in the luminosity of the air and its varying odors; that their bodies play the combined parts of a hygrometer, a thermometer and a barometer.

If their senses were as good as the instruments they would carry a mass of information which would explain many mysterious movements, though it would still have to be explained how the animals detected these things and by virtue of what degree of fineness in what senses.

But the chief mystery remains unprobed, even when we have explained why horses trembled and refused to leave their stalls before the earthquake, or why a monkey hurried for protection to its master.

Such anticipation of events has still to be explained in a different way from the traveling instinct and sense of direction, which are the chief mystery. But it is good logic to imagine, until the contrary is proved, that both powers come from the same source.

If it can be shown, as some of the owners of these homing pigeons imagine, that electrical vibrations from radio-telegraph or ether waves really affect the birds, a popular view, rather despised by men of

science, comes into its own—birds and animals must have what has been called an electrical sense.

"Electric" has been used vaguely enough to explain anything inexplicable; but here it has a definite enough meaning. It means that these animals are, so to speak, in touch with the ether, that mysterious "fluid" which carries the messages from the wireless stations as it carries the vibrations of light from the sun and stars. Something similar to ether must exist, joining the earth and stars.

Through it these electric waves pass, and we have instruments subtle enough to catch them and record them. If our instruments can do this, is it so impossible that birds are similarly tuned? If they are so tuned, it is a small stretch to imagine that the course of the earth, the incidence of the seasons, the movements of light, may affect ethereal vibrations as wireless or thunderstorms affect them, and so may carry to the sense of birds curious and certain news.

The foreknowledge of earthquakes would issue not from fine hearing or supersensitiveness to warmth or moisture, but to direct contact with electrical change. Any naturalist can give evidence of the responsiveness of many animals to the phenomena of thunder. Highly strung people, especially women, have like sensations, as if it were only in certain physical states that the sixth sense had play.

If we suppose that living things can feel what the wireless receivers record, it is easy to imagine the confusion in instinctive sensations that would follow; how these abrupt and powerful vibrations from the radio-telegraphic stations would interfere with previous electrical experience. They might frighten birds like a flash of lightning, as well as disturb the whole complexity of the cosmic system with which these animals have contact.

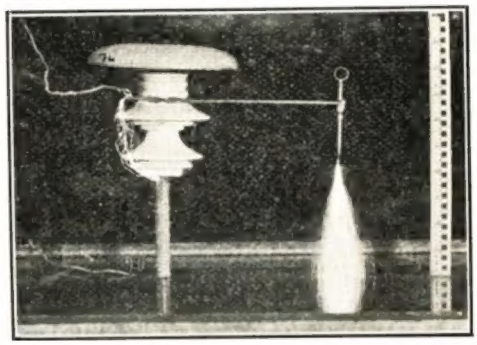
In every sense the whole idea is "in the air"; but the greatest discoveries have come from vague hints. It would at the least be worth the trouble of some curious investigator to test the effect of the ether waves on animals. It should at least be possible to detect, if it exists, the responsiveness to this stimulus. Possibly there may be in existence some evidence of the behavior of birds, especially of gulls, in the neighborood of wireless stations.

HIGH TENSION INSULATOR TESTS.

By Frank C. Perkins.

THE method employed in Italy for testing high tension insulators for use on power transmission lines is indicated in the accompanying illustration. It will be noted that the porcelain insulator carrying one wire from the transformer and arranged with a pointed terminal is mounted over a vessel of water, the support of the insulator passing into the water and connected under the surface with another test wire from the transformer which supplies a pressure from 50,000 to 200,000 volts.

A brilliant, hissing, crackling arc is not only formed between the water and the pointed terminal, but also frequently breaks around the insulator as the voltage is increased to a maximum. The



centimeter scale at the right indicates the length of the arc which may be adjusted by the movable terminal.

A spray of water is frequently allowed to descend upon the insulator under test producing artificial rain in order to get as near as possible actual conditions existing on transmission lines during a storm. The potential used is usually far greater than the insulators are required to stand under normal condition in order to insure the safe operation of the same at all times.

WIRELESS TELEGRAPH STATIONS.

It is contemplated to establish wireless telegraph stations in German East Africo, Togoland, Kameron and Southwest Africa, and also between the different South sea colonies.

Typewriting By Wire

The news from Washington that the Battleship Nebraska is to be the first of Uncle Sam's Dreadnoughts to be equipped with the American Telegraph Typewriter for observation, and ship order communication calls our attention to a new invention which, although developed without ostentation, bids fair to become as important an industrial factor as the Morse telegraph or Bell telephone.

The inventor of this new electrical marvel is Dr. G. A. Cardwell of Brooklyn, New York, whose fame is secure, his name in the patent office being second only to that of the wizard, Thomas A. Edison.

Receiving Messages in Philadelphia Sent by the American Telegraph Typewriter Over a Telephone Wire from Williamsport, Pa.

Dr. Cardwell's fertile brain also fathered the automatic telephone switch, for which he is reputed to have received $300,000, the anti-induction coil, a duplex telegraph, and a dozen or more other inventions. His latest and greatest invention is the Telegraph Typewriter.

The telegraph typewriter is a device by which the copy written on one typewriter is reproduced exactly and simultaneously at any distance on one or any number of typewriting machines by means of an electro-magnetic mechanism controlled by electric impulses. The pressing of any given key throws onto the line three impulses of unlike polarity which work the polarized relays at the other end so as to control the selective mechanism in the printer. Thus, the first impulse turns the type wheel half the way round on a certain letter, the second impulse turns

(Continued on page 474)

A Corner in the Inspection Room of the American Telegraph Typewriter Company. No Machine Sent Out Until it is Thoroughly Tested.

Motor Brush and Commutator Care

By Harry Paris.

NOTHING is so injurious to a motor as a sparking brush. The heat developed will oxidize the copper of the commutator, forming a film of burnt copper and carbon upon it thereby partially short-circuiting it. Then the sparking increases, finally terminating in severe arcing. Sparking brush contacts are dependent on a variety of causes. The most common being overload. A current of, say six amps., may be carried successfully from the brush face to the commutator at no load and at full load we will say 10 amperes are drawn and if the motor is designed correctly it will stand an overload of 25 to 30% without detrimental effects to the brushes. The first procedure in remedying overload troubles is to ascertain if the brushes being used are large enough to carry the current and if not, larger ones substituted. For severe overload cases, the services of an expert are usually necessary and often the substitution of a heavier motor is required.

Another cause of sparking brushes is a faulty commutator. A loose bar or one that has worked itself higher or lower than the rest, or a commutator that has been worn in ridges from improper brush regulation will spark considerably. The brushes should not be set any tighter than necessary, i. e. so that they will not spark either at starting or at peak. Squeaking or chattering brushes are caused by an uneven or a rough commutator, too much pressure or a gummed (from oil) condition of the brush and commutator face. Brushes spaced incorrectly or set with too little pressure are frequent causes of sparking. Often if the brushes are placed carelessly in their holders and not all of the surface makes contact with the commutator, sparking or more often arcing takes place. In renewing brushes or cleaning old ones a device is suggested below for the forming of a curved face for carbon or graphite brushes. Procure a wooden cylinder that when wound with a layer of fine sandpaper, will have the same diameter as the commutator. Place this in a lathe chuck and grind the face of the brush at whatever angle desired.

Other causes of sparking are frequently traceable to the brushes not being set at the neutral point or a section of the armature short circuited.

Either of these troubles usually require the services of an expert. A day to day inspection of the commutator and brushes is essential if a smooth running motor with a high efficiency factor is desired. A bright and shining commutator is not the sign of a well regulated motor or dynamo; neither is a black or charred one. A bluish bronze or chocolate color denotes a well cared for motor and one adapted to the load it carries.

Commutator compounds should not be used unless of reliable make and then sparingly. The best "dope" for commutators is a little pure paraffine or vaseline applied to very fine sandpaper and the sandpaper rubbed lightly on the surface of the commutator while running. Emery paper should never be used as the coating is conductive and will work in between the segments and partially short circuit the commutator. A. C. brushes or collector rings need little attention unless they become oil soaked and gummed, when they may be easily cleaned off with sandpaper or alcohol.

NEWS BY WIRELESS.

The Dayton (O.) Journal issued on September 24 what is said to be the first newspaper ever published in the United States wherein all the news was transmitted to it by wireless.

The Journal has erected a complete wireless station on the roof of its new home and uses the service of the Overland Wireless, whose main station is at Columbus, O. A number of big local news stories were carried, including President Taft's arrival at the State Capital.

Unique Swiss Laboratory Electro Magnets

By Frank C. Perkins.

At the laboratory of l'Ecole Normale Superieure de Paris there is a Weiss

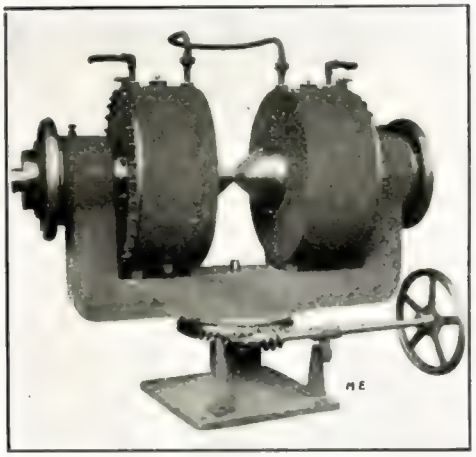


Fig. 1.

experimental electro-magnet in use of 150,000 ampere turns, as shown in the accompanying illustration, Fig. 1. It was designed by M. P. Weiss and built at the Oerlikon Works, in Switzerland. Each magnetizing coil has ten sections, with 75 turns of copper ribbon 13 millimeters wide and one millimeter in thickness in

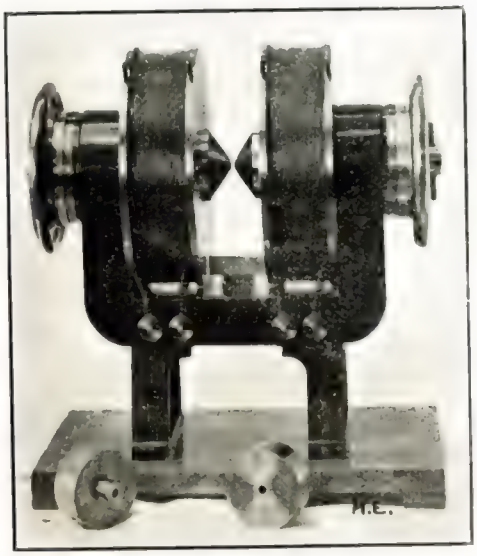


Fig. 2.

each section. The ten bobbins forming each of the two coils have a total of 750 turns. The total resistance of the magnet with its 1,500 turns is 2.5 ohms when cold. With an exciting current of .625 amperes the magnetic intensity is 11,650 Gausses, and with ten amperes excitation current 41,100 Gausses; while with 53 amperes the magnetic intensity is increased to 460,250 Gausses. A third

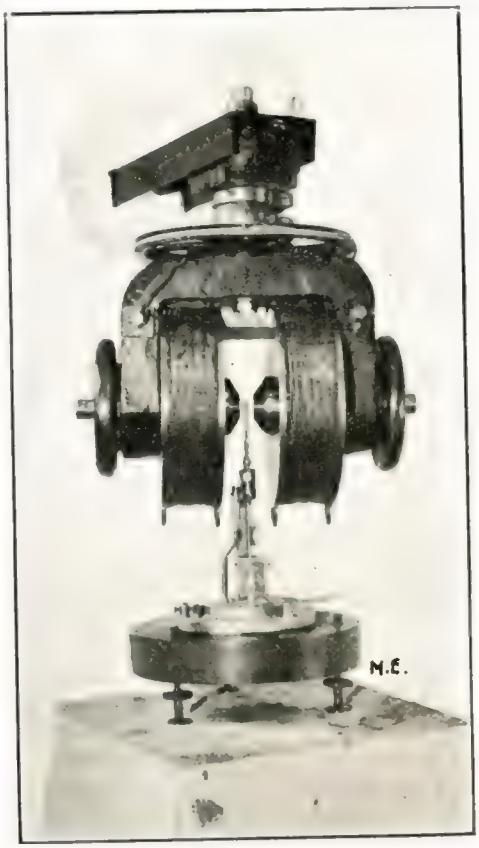


Fig. 3.

electro-magnet of the Weiss type has been constructed for the Department of Commerce and Labor of Washington, D. C.

Two other forms of laboratory electro magnets of the Weiss type, constructed at Geneva, Switzerland, by the "Société Genèvoise Pour La Construction, may be seen in the accompanying illustrations, Figs. 2 and 3 and drawing Fig. 4. The

former is desinged for suspending from the ceiling or side wall while the measuring instrument is mounted on a concrete pier below. These magnets are not water cooled, but have a pair of open

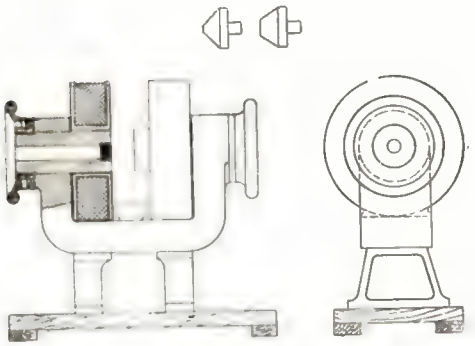


FIG. 4

coils 88 millimeters in width and 303 millimeters in diameter, outside measurement. Various forms of magnet poles are screwed into the cores, according to the test to be made. The circular cores of the magnet coils are 92 millimeters in diameter, while the U-shaped bar of Swedish iron is of rectangular section, measuring 150 millimeters in width and 60 millimeters in thickness.

THE RAILOPHONE.

The railophone, the invention of Mr. Hans von Kramer, is designed to enable travellers to phone from either a train in motion or a stationary train and to receive telephone messages while on the train. The principle applied is that of induction from large wire frames of a special construction which are suspended from the bottom of a railway coach near the track. From the frames the terminals of which are connected to telephone instruments placed in a sound-proof box on the train, electrical impulses are induced in a stationary wire fixed between the track rails on which the train travels, one wire being laid on the "up and a similar wire being laid on the "down" track. The ends of these stationary wires are connected up either to the telephone apparatus at the railway terminus or to an intermediate station between the terminals. The messages received from the train are telephoned or telegraphed by the railway company to their destination or vice-versa i. e. communicated to the passengers on the train.

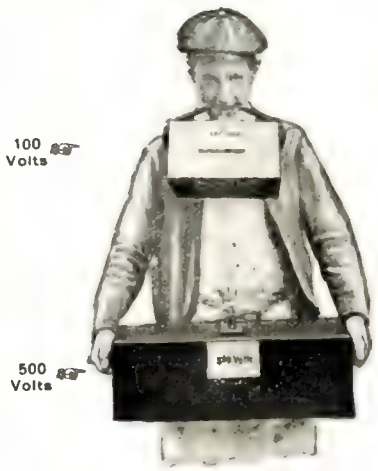
A NEW PORTABLE TESTING BATTERY.

A neat form of portable storage battery for testing purposes has been brought out by E. Marcuson, of New York City.

Numbers of very small cells are assembled in boxes to form batteries of any desired voltage. The batteries are portable in every sense of the word, the 100-volt, 168-volt and the 256-volt batteries weighing 16½, 27 and 40 lbs. respectively. A special commutating switch permits of charging the batteries from 100-110-volt D. C. mains. The elements, containers, separators and electrolyte are all visible, accessible and removable, and it is claimed that a battery need never be returned to the factory for repairs, as all parts can be renewed with perfect ease, by anyone, in a few moments.

That these testing batteries are thoroughly practical is evidenced by the fact that during the past two years they have been adopted by The Interborough Rapid Transit Co., The New York Edison Co., The United Electric Light & Power Co., The Postal-Telegraph-Cable Co., The Standard Underground Cable Co., and others.

Although principally used, at present, in potentiometer work, calibration of instruments, insulation tests and continuity tests, doubtless other uses will be found



for these batteries as they become better known. Since the internal resistance of the batteries is low, comparatively high rates of discharge are possible. For instance,

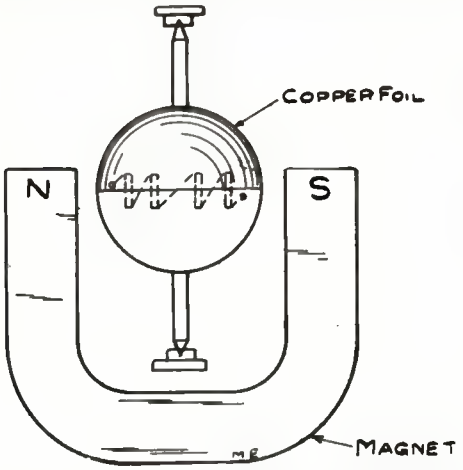
(Continued on page 441)

Why Do Wireless Waves Travel Farther By Night Than By Day

By Professor W. Weiler, of the University of Esslingen (Germany).

Ever since the days of the coherer and de-coherer systems, the above question has been asked a great many times and has been answered with different theories. Many theorists think that the ultra-violet rays of the sun absorb the electro-magnetical waves, which latter differ only in that respect from the light waves, on account of their shorter wave length.

Mr. W. N. Fanning of the U. S. Navy, has a new theory which he explains in the September issue of Modern Electrics. He takes the earth as the armature of an electro-magnetic motor with the sun as its magnetical field. He thinks that the transmission of the electrical wave over the surface of the earth during the day time resembles a Wireless Wave, passing between the armature and the pole pieces of an electro-magnetical Motor or a Generator. During the night time, he says, the earth short-circuits the magnetical field of the sun, and we now have a space a little smaller than half of the surface of the earth, which is the ideal requirement for Wireless Transmission. If this theory is correct, we can now understand why Wireless Waves travel easier in the direction of the meridian from south to north, i. e. in the direction of terrestrial magnetical lines of force than in the vertical parallels. It has happened quite frequently that two stations could work with each other at ease before sunrise, while after the appearance of the sun over the horizon, this was not possible any more.



Fanning's theory will be strengthened considerably by the following description of a patented apparatus of Engineer Eotz of Charlottenburg (Germany):

Between the pole pieces of a permanent magnet made of Tungsten steel alloy, a sphere is suspended on a steel point with a saphire bearing, which works almost without any friction. The upper half of the sphere is made of very thin copper foil. In the inside of the sphere there is placed a number of small thermo couples made of the very finest wires of copper and Konstantan, and these thermo couples are of such an extraordinary sensitivity, that the sphere begins to rotate, when a person breathes against it, the heat of the breath being enough to produce a current in the couples. If one directs the reflector of a small oil lamp against the sphere, the latter rotates continuously.

If now the permanent magnet is arranged in such a way that its north pole points towards east and the south pole towards west, and if one heats the sphere near the north pole, the imaginary European Continent which lies opposite of the North Pole turns from east over south towards the west; if, however, one breathes against the South Pole, the imaginary American Continent rotates from west over south towards the east.

The steel magnet in this apparatus represents the magnetical field of the sun, which produces the terrestrial magnetism, and the heat rays of the sun, which produce the thermo currents of the earth and therefore are effective in rotating the earth on its axis. The above not only confirms the Fanning theory but also gives a very good explanation on the unsolved problem of the rotation of the earth around its axis, and necessarily also of the rotation of the earth around the sun.

A Simple Current Gauge

By Austin C. Lescarboura.

HAVING heard of the wonderful merits of the Tungsten lamps for economical lighting, the writer decided to give same a trial. The current used was 110 volts, direct current, from the Edison system in New York City

As the recording watt meters in most cases (especially in direct current types though not in the Westinghouse new style glass case meters) do not show the aluminum, it is very difficult to compare the power consumed by different appliances. With an ammeter the problem would be simple, but without any instruments the writer was left to his own re-

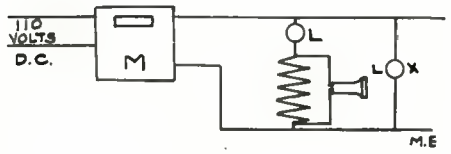


FIG. 1

sources. He proceeded to wind about fifty turns of wire (insulated, any size from No. 24 to No. 28 B. & S.) on a lead pencil and connected this to a lamp socket in series with a lamp as shown in diagram No. 1. The watt meter being nothing more or less than a small motor, interrupts the electrical current at the motor's commutator, which is audible in a telephone receiver. To obtain the loudest results, a receiver of high resistance and very sensitive, such as a wireless telegraph type, should be used; however, a 75-ohm receiver will do.

The sound caused by the commutators of the large generators at the central or substation will be heard, and produces a fairly high pitch note. The meter clicks will be heard through this and the succession of the clicks will be in proportion to the current consumed. Thus, if one sixteen-candle-power lamp is used the clicks may be about fifty to the minute as counted by the watch in the experimenter's hand. If the clicks then increase to 150 per minute, he will therefore know that about 1½ ampres or three sixteen candle-power lamps or their equivalent are being used. A 16 c. p. carbon filament lamp should first be used to obtain a factor to compute the unknown current, and the clicks heard with this lamp will be equal to ½ ampere on 110 volts.

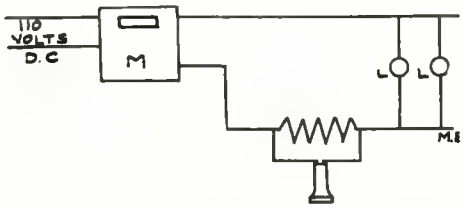


FIG. 2

This method proves very efficient in practice and was used with satisfactory results to test the consumption of current with various style of incandescent lamps. However, the writer does not think that this idea will work on alternating current. Furthermore if the reader wishes to avoid the confusing problem of having to figure the current being used by his own lamps, he may place the coil directly in series with the current supply as shown in Fig. 2. For

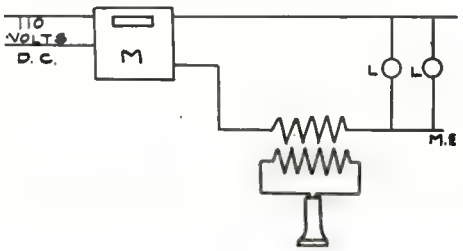


FIG. 3

best results a telephone coil of 150 ohms or 250 ohms should be used as in Fig. 3.

WIRELESS OUTFIT FOR POLICE.

A part of the equipment of the new $3,000,000 police headquarters in New York is to be a wireless telegraphy outfit operated from the dome. It is expected that branch stations will be established in outlying districts of the city and in other counties, so that if wires fail, communication may be maintained.

Construction of an Exhausted Coherer

By Kreigh B. Ayers, E. E.

THE coherer which the writer is using in his station was designed by himself, and made by an electrical scientific apparatus maker. Fig. 1 shows the

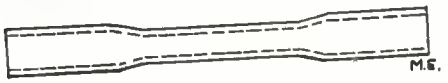


FIG. 1

glass tubing used for the coherer. It was necessary to have one blown to suit. The ⅛ inch bore in the center of the glass tube was a perfectly true cylinder, in order to insure a good fit for the contact plugs.

Fig 2 shows the contact plugs; these was machined from a solid bar of pure silver 3 inches long by 3-16 inch diameter and cut in two pieces, each 1½ inch long. It will be seen that each plug is one piece, in order to eliminate the resistance of soldered joints. The dimensions of the plug heads cannot be given exactly as they were machined to fit the tube very snugly so when mercury was

FIG. 2

poured in one end of the tube, nothing passed through.

For the filings used between the two contact plugs, the writer made an excellent mixture that never fails. He used 95% nickel, 4% silver and 1% of an alloy composed of 33 1-3% copper, 33 1-3% silver, and 33 1-3% nickel. The filings are made in a very careful manner, so that each grain is perfect. These grains for the filings may be purchased from the wireless telegraph instrument supply houses.

Upon assembling, the filing were

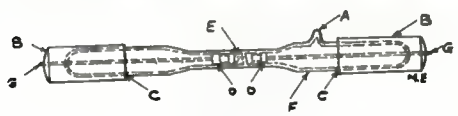


FIG. 3

placed between the two silver contact plugs, (only 1-16 inch apart), and a pair of brass caps placed over the ends of the glass tube, the silver rods passing through a hole in these brass caps at G, as shown in Fig. 3, then soldered and trimmed off. The brass caps were hermetically sealed to the glass tube with a very strong composition of sealing wax. (Beeswax and rosin). Afterward the whole coherer was sealed, after the air was drawn out. The coherer when finished is shown in Fig. 3.

a—The tip where the exhausting process took place.

bb—Brass caps for the external connections.

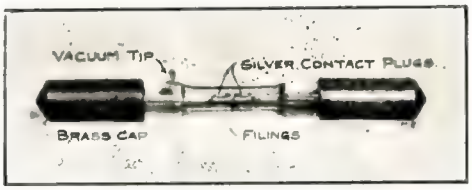


FIG. 4

cc—The space for sealing the tube with sealing wax.

d—The silver contact plugs.

e—The filings.

f—Glass tubing.

gg—The soldered joint of the silver rods to the brass caps.

A photograph of the finished coherer is shown by Fig. 4.

Fig. 5 shows the method of fastening

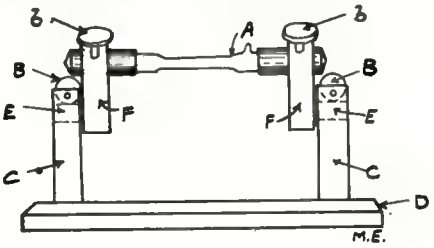


FIG. 5

the coherer in position on the standards. (The diagram is a self-explanatory one.)

a—Coherer in place.

bb—Adjusting thumbscrew for holding coherer.

cc—Brass pillar (3 inches high by ⅝ inch square).

B'B'—Thumbscrews to adjust the vertical height of the coherer brackets F.

d—Fibre base.

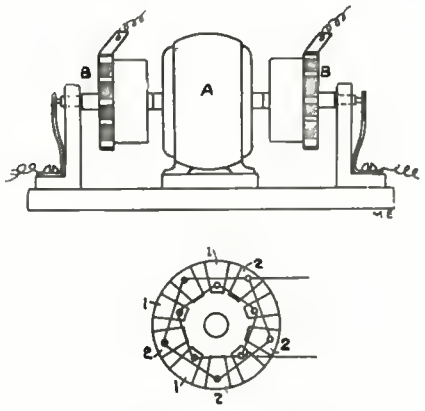
E—Stud of the brass bracket, F, through the pillar, cc.

(Continued on page 456)

Paris Letter

NEW MULTIPLEX DEVICE.

A new method for duplex or multiplex working has been lately brought out which consists in using a rotating commutator to put the different instruments rapidly and in turn in connection with the aerial circuits. In this case separate aerials are used for transmitting and receiving. Referring to the figure, the motor A serves to drive the two rotary commutators B. B. For multiplex working there are used conducting segments such as 1, 1 and 2, 2 upon a commutator, and these are connected to two or more transmitting and receiving instruments, so that they are joined in succession to the aerial circuits.

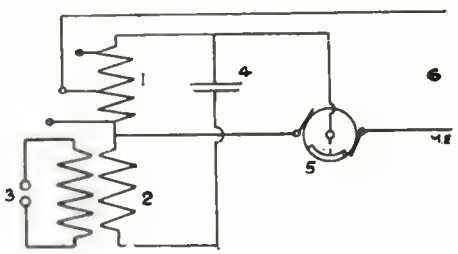


A NEW WIRELESS SYSTEM

At the British Association meeting at Sheffield, Prof. E. Wilson brought out the following method for wireless working. Energy is stored in a magnetic field by an inductance 1 (see diagram), and it is then allowed to surge into a condenser 4 which forms with the inductance 1 a low frequency oscillation circuit, when the energy is accumulated in the condenser 4, this latter is mechanically bridged across the primary winding 2 of an induction coil with which it forms a high frequency oscillation circuit. Energy is then sent by the secondary winding 3 of the induction coil to the work circuit, and can be of either an oscillatory or unidisectional character as desired. To give the above contacts we use a contact maker 5 driven by a small motor. A set of tapping points on the coil 1 allow of varying the voltage.

Prof. Wilson states that upon the "make" contact, the system is switched on to the supply mains, and the current rises in the winding of 1 so as to build up a magnetic field. When enough energy has been stored up, the system is disconnected from the mains, thus giving the "break." As only the current of the condenser 4 passes through the primary 2, the inverse electromotive force induced in the secondary 3 is small and negligable, but if need be it can be quite eliminated by modifying the connections. At the moment of the "break" the energy stored in 4 is added to that in 1, and then the total energy of 1 begins to surge into the condenser. At the precise moment when the condense has received all of the energy on account of its reverse charge, the contact maker 5 short circuits 1. The condenser then discharges with great rapidity through 2, and energy thus oscillates between the condenser and primary in the well-known way. As is known, the electromotive force induced in 3 may be of an oscillatory or unidisectional character according to the nature of the work circuit.

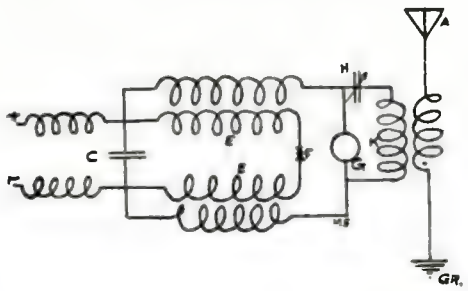
The following advantages are obtained: 1. But a small magnetizing current is needed, as 1 has a nearly closed magnetic circuit. The loss due to heat in the wire is small and we thus have a high yield. 2. Owing to the long periodic time of the system, the voltage at 5 at the break does not rise to a high value, or rises so slowly that the contacts are well



separated before this time. No oil or gas is needed for the contact maker. 3. As there are only a few secondary turns, this gives a coil of light and cheap construction. 4. We also have a low resistance for the secondary, which is an advantage. 5. The iron in the spark coil is small in amount, and it can thus be better laminated and insulated. In general, the above system gives a light, portable and cheap outfit.

RADIOPHONE SYSTEM.

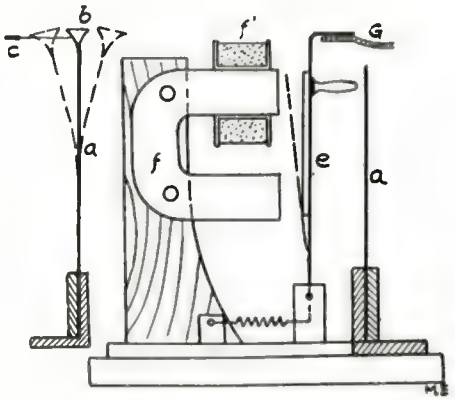
The following method allows of using the waves set up in a Duddell arc circuit to be used for direct receiving in a telephone. Here the high frequency wave train which is continuously produced is varied in amplitude in a periodic manner and, the frequency of this variation is kept within the proper limits so as to be audible. This is caried out by impressing on the circuit feeding the high frequency circuit, the oscillations set up in a second Duddell circuit of low frequency. In the diagram, the oscillations in the low frequency arc circuit E, F, C, are trans-



ferred by induction to the feeding circuit of the high frequency arc combination, G, H, K.

UNIQUE SIGNAL.

We illustrate a signal device which works on the principle of using a vibratory current of a certain pitch for each signal. The indications can represent different letters or can show the numbers representing the various frequencies which are used. A set of selecting spring tongues is used, these tongues being excited as usual by an electromagnet. Each tongue B is provided with a stirrup shutter mounted at the top, and the shutters work upon projections from a fixed plate C, this latter having a comb-shape with as many teeth as there are shutters. When we receive a signal which has a frequency of say, 100, the tongue which is tuned to this pitch will vibrate, and this causes the stirrup to uncover the figure or letter which this particular tooth carries. We thus have the signal which is proper to this special pitch. Should we wish to use several tongues to correspond to each frequency, the shutter is carried by a supplementary arm E, which is operated when the tongue A sets up its vibration. The arm E is placed so that



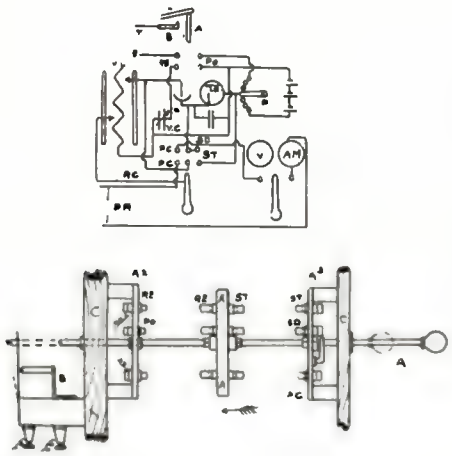
it is moved when any one of the tongues A of the same set is vibrated. At the top of the arm E is a shutter which covers one of the signal teeth G, and the shutter is driven off when the vibration occurs. Near E can be placed the magnet F, so as to hold down the arm when this approaches it, and the shutter is permanently held off. Alternating current is sent in the coil F' so as to release the arm when desired, and this current is put on by a resonance relay.

CHANGE-OVER SWITCH.

We illustrate a change-over switch for connecting either the transmitting or receiving circuits to the same aerial. It has the form of a rod which can be driven back and forth and carries a contact plate. The diagram shows the electrical connections. The metal rod A slides in the fixed parts C, C, and this rod is in permanent connection with the receiving circuit RC. A spring L which is connected to the aerial, is in contact with the rod B, this latter being joined to the transmitting circuit. When the rod is moved to the left so as to make contact with the spring L, this breaks contact between L and B. At the middle part of the rod is mounted an insulating plate A', and it has pairs of plugs which make the

contacts for the local circuits. The plugs R' E' (only one of which is shown here) enter the sockets RE on the left hand fixed plate, and the other contacts on the same side have a like arrangement. On the other side, we have the plugs S' T' and the corresponding sockets ST, etc. In the diagram, the rod A is in the position for receiving messages. The local circuits through RE and PO (which are now put on) have the variable inductance VL, the detector D, variable condenser VC, telephone TE, potentiometer P, and the local battery. The inductance is connected through the rod A to the spring L and thus to the aerial.

By throwing over the switch, the aerial is now connected to the wire T of the transmitting circuit, this wire being grounded through the secondary of the oscillation transformer, etc. The circuits



of the inductance and potentiometer are opened at RE and PO, and the telephone and detector are short-circuited by bridging the gaps SD, ST. Connection is made at PC from the wires PR which are in circuit with the alternator for the current supply, using the Morse key M.

THE PORTUGAL REVOLUTION.

Another success has been scored by wireless. The first news of the revolution in Portugal reached Paris in this way, as all the other communications were cut off. The message anouncing the event was sent by wireless from a vessel off the coast of Portugal, and it was received at the French post of Saintes-Maries, near Marseilles, being then telegraphed to Paris, so that it was published in the morning papers.

DANVERS WIRELESS ASSOCIATION.

The Danvers Wireless Club was formed on September 16, with eight charter members. Officers: President, Chester Robinson; vice-president Hollis Nickerson; secretary and treasurer, Oliver Everett. Meetings will be held on the last Friday of each month. The object of the club is to promote the interests of the amateurs, to bring them together and exchange ideas. A paper will be read each month on some subject of interest to all of the members Any person in Danvers or vicinity having a wireless station, or who is building one, may join the club. Make all applications to the secretary.

OLIVER S EVERETT,
Franklin St. Secretary.
Danvers, Mass.

AEROPLANE WIRELESS.

A remarkable juxtaposition of ancient and modern work of men took place the other day when Mr. Robert Loraine, the actor-airman, flew in his aeroplane above Stonehenge. He was conducting experiments at the war office flying ground on Salisbury Plain with an apparatus invented by Mr. Thorne Baker for wireless communication between an aeroplane in flight and a station on the ground.

WIRELESS BOAT CONTROL.

Mr. A. Roberts, a young Australian inventor, recently gave a demonstration at Dagenham, of the working of his wireless apparatus for controlling the movements of boats on the water. He is able to control a submersible torpedo as well as a motorboat on the surface.

NEW PORTABLE TESTING BATTERY

(Continued from page 435)

an ordinary 8c. p. or 16c. p. 100-volt lamp can be fully incandesced for a considerable time, thus enabling wiring contractors to test the continuity of the various circuits and fittings before the main current is available.

An idea of the compactness of the batteries will be gained from the illustration, which shows a man carrying a 100-volt and a 500-volt battery.

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Vol. III NOVEMBER No. 8

EDITORIAL.

The Wireless Association of America has lately received many letters as to the real object of the Association. The real object of the Association is to form one great body of Wireless Experimenters and Amateurs in the United States; to safeguard the interests of all members, to oppose projected, unjust legislation, which every once in awhile, is put before Congress by certain stock selling Commercial Wireless Companies, who have not the interest of the new science at heart, but rather the immediate prospects to sell stock. This has been amply proved of late by the disclosures of the government of some of the Wireless Companies, who are not in the business to further the new art, but rather to enrich certain promoters.

A recent campaign conducted by the heads of the Wireless Association has done much to stamp out unjust legislations, and it is very unlikely, at the present time of writing, that the amateur and the experimenter in the United States will be lost sight of when some of the now pending bills come before Congress. In fact, very little is to be feared from this side now, especially now that almost every amateur fully recognizes the great harm he can bring about by sending so-called "fake" messages.

The Wireless Association of America now has over 10,000 registered members, and comprises about 50-odd subsidiary Associations and Clubs, who all come under the body of the original Wireless Association of America. One of the main objects is, of course, to bring all the members of the Association together, and the Business Manager invites anybody who has a station anywhere in the United States, and who desires to get in communication with unknown amateurs in the neighborhood, to communicate with him, and he will send a number of names free of charge to the applicant in his immediate neighborhood; such services are, of course, free of charge except that a stamped envelope must be enclosed for the answer.

All communications should be addressed to the

WIRELESS ASSOCIATION OF AMERICA,
233 Fulton Street, New York.

NEW LIQUID MICROPHONE.

A new type of liquid microphone, well suited to the uses of Wireless Telephony, has been recently brought out by F. J. Chambers, of England.

In the sketch shown, A is an ebonite base, having a male threaded portion upon which is screwed the ring holder of ebonite; H, which has a female thread cut on its underside. In this ring holder is mounted the metallic diaphragm, D, held in place by the metal ring H2, screwed fast to H.

The backlash between the holder H and base A is taken up by U shaped springs, K. Those also serve to make a good connection between a second metal ring, A2 and H2.

From the metal ring, A2, a connection is led to one of the terminals. One electrode is the diaphragm, and the other a small metal nipple, M, connected to the other terminal of the microphone by the wire connection N.

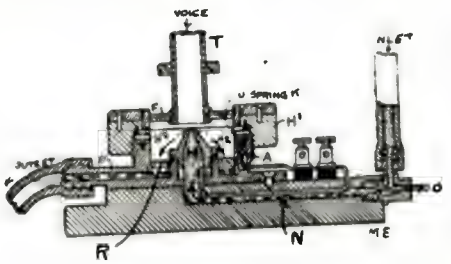
The liquid is led into the inlet pipe, marked inlet, down through a small needle valve, O, so that the rate of flow may be adjustable, out of the centre or nipple of the lower electrode against the aforesaid metal diaphragm and into the annular chamber, R, from which it passes away through the discharge pipe, P.

In use the distance between the diaphragm and the lower electrode is varied by turning the ebonite holder, H', upon the threaded portion, A.

The sound waves are conducted to the diaphragm by the speaking tube, T, which passes through a felt disc, F, which confines the sound, and makes it possible to rotate the holder, H', without interfering with its operation.

It is claimed that this transmitter behaves well under load up to 500 watts, and that the reproduction of speech is made very faithfully.

A great advantage of this instrument is that the normal resistance is constant, and may be adjusted to suit any conditions desired.



This microphone is placed directly in the high frequency circuit, and gave very good results in recent tests.

PUZZLED BY WIRELESS.

"Mistah Jenkins," asked an old negro of Atlanta of his employer, "would yo' be so good, sah, as to explain to me 'bout this wireless telegraph business I hears 'em-a-talking 'bout?"

"Why, certainly, Henry," responded the employer, "though I can do so only in a general way, as I myself know little of the subject. The thing consists in sending messages through the air instead of over wires.

"Yassah," said Henry, "I knows 'bout dat; but, sah, what beats me is how dey fasten the air to the poles"

"What do You Like Best in Modern Electrics?"

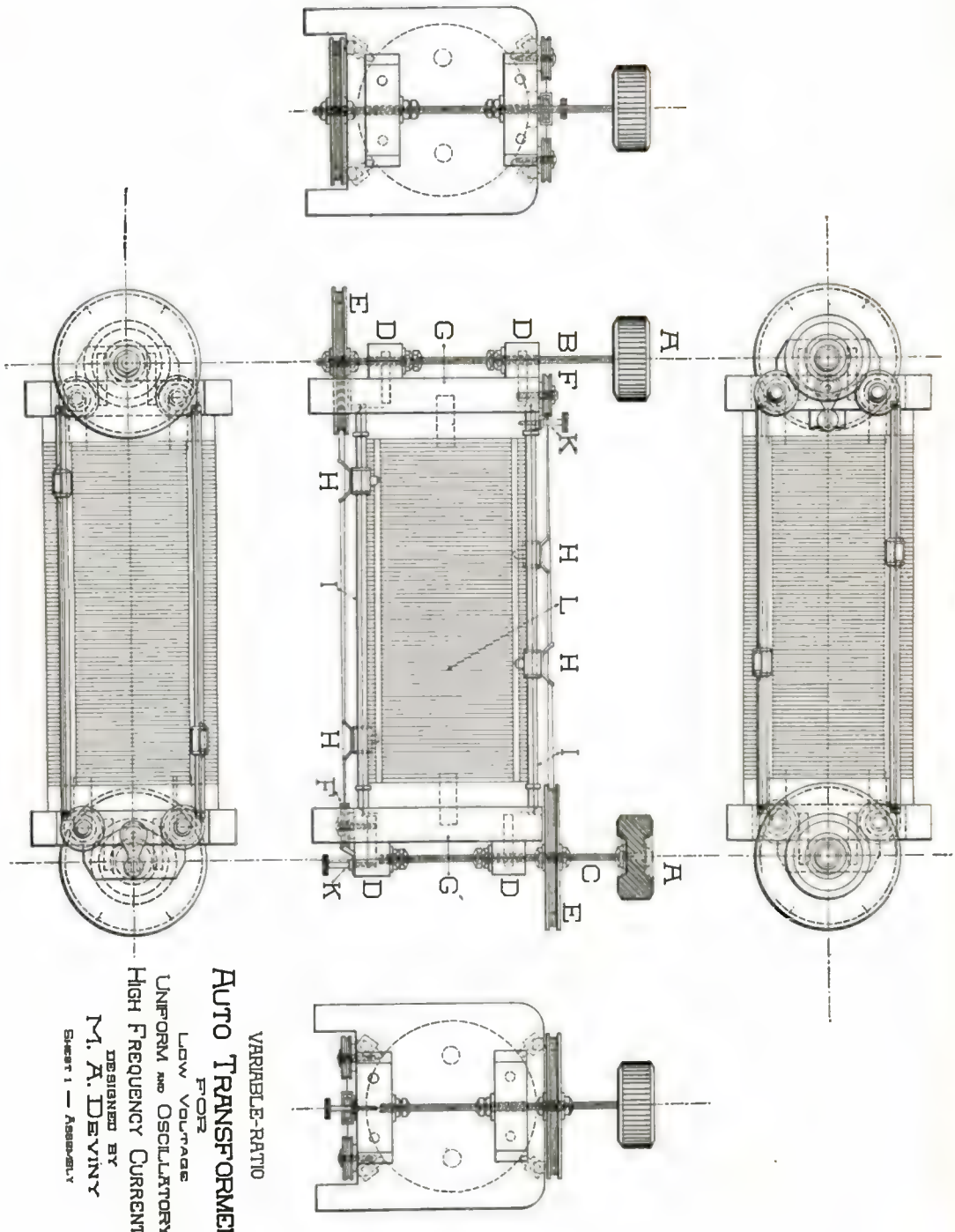
We now give you a chance to cast your ballot and vote on what you consider the most interesting feature in MODERN ELECTRICS each month. If there is any particular department or branch which appeals to you more strongly than another, let us know what it is by placing a check before that subject in the list given below; cut out and paste on the back of a post card and mail it. This will enable us to get an idea of just what the majority of readers like best; as our motto is to print what the *reader wants* and not what strikes the Editor's fancy. For our mutual benefit check off your favorite subject on the list below and mail it to-day:

PRACTICAL ARTICLES
TECHNICAL ARTICLES
PARIS LETTER
EXPERIMENTAL DEPARTMENT
WIRELESS TELEGRAPH CONTEST
ORACLE

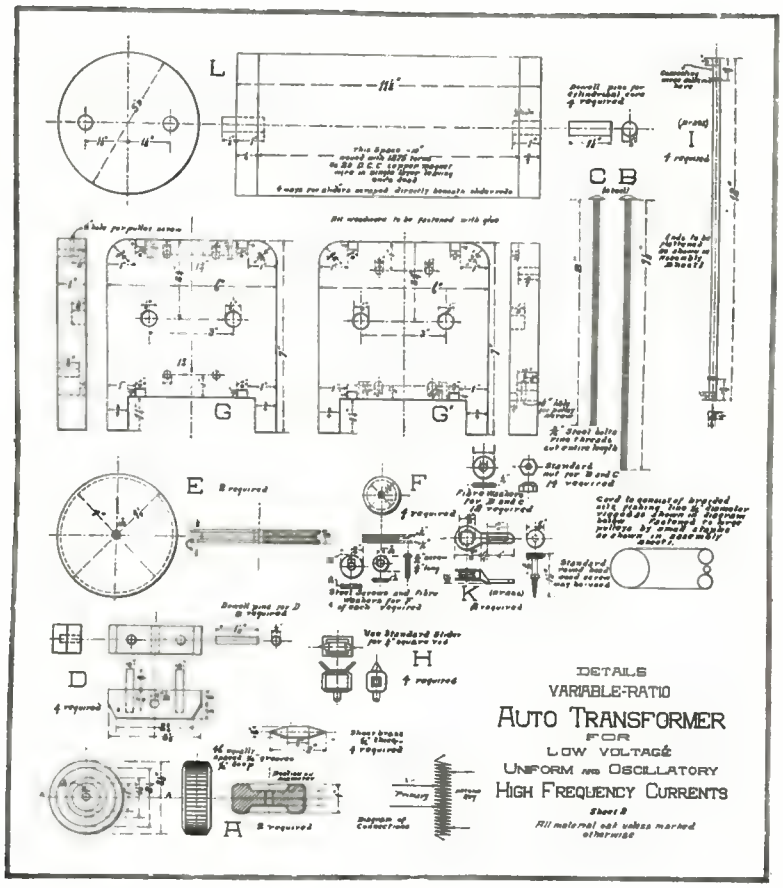
Address the Editor, MODERN ELECTRICS, 233 Fulton Street, New York City, N. Y.

Design for an Oscillation Auto-Transformer

By M. A. Deviny, B. S.



THE accompanying drawings are illustrative of a special type of high frequency auto-transformer, based upon the principles set forth in the article "The Oscillation Transformer," which appeared in the August number of MODERN ELECTRICS. The design of the instrument, while incorporating the most convenient methods of operation, has been made as simple as is consistent with satisfactory service. The drawings themselves are self-explanatory, and require no further description. A few suggestions are here presented, however, which may prove helpful to those undertaking the construction of the instrument.



Wood-Work.

For the benefit of those who have not the facilities for wood turning, or those who desire to save time on this part of the work, it is recommended that they have the wood parts made for them. These may be obtained in the exact dimensions here given, at any wood-working establishment or planing mill, at a very moderate cost. Oak is specified, but any other well seasoned wood may be substituted if desired. The dimensions of the ends, supports, and the case containing the instrument can be slightly altered if necessary, but under no circumstances should the dimensions of the core be changed.

Metal Parts.

Nearly all of the metal parts may be obtained from any good supply house. A possible exception are the shafts, B and C. Bolts are specified for these, but in some places it may be difficult to obtain them of the diameter and length here given. In this event, it is advisable to use steel or brass rods of the proper diameter, and to have them threaded their entire length. Some additional threading will be necessary even if bolts are employed, as it is essential that the threads extend a sufficient distance to enable the knobs A and A' to be held fast

to the shaft. It must be remembered, however, that if rods be used, two extra nuts and washers will be required to take the place of the bolt heads. After assembly, the nuts between the shaft supports are to be tightened sufficiently to allow the slider system to move freely but firmly.

Standard ¼ in. square brass rods may be used for the slider rods. These, together with the sliders, may be obtained from any dealer in wireless supplies.

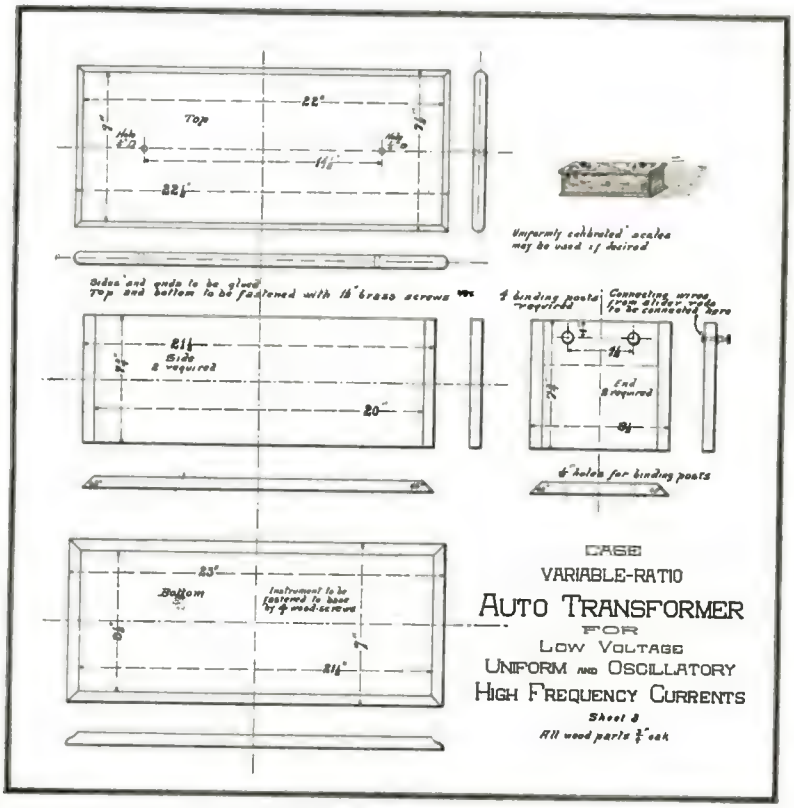
A most essential part of the mechanical construction of the instrument is the adjustable belt-tightener. A pulley of the type shown on the detail sheet is most convenient for this part. If this is not readily obtainable, a small standard pulley may be adapted to this purpose, provided slight changes be made in the tightener supports. If it is so desired, a round-head brass wood-screw may replace the special milled thumbscrew shown on this part.

The Slider System.

The two cords for operating the sliders should pass around the large pulleys 4 or 5 times. Two small staples should be driven in the face of the pulley over the inner turns of the cord as shown. This measure will prevent any slip between the pulley and the cord when the hand knobs are turned. It is necessary that the small brass pieces attached to the sliders be bent in such a manner as to render the pull of the cord as direct as possible, so that smooth operation may be secured.

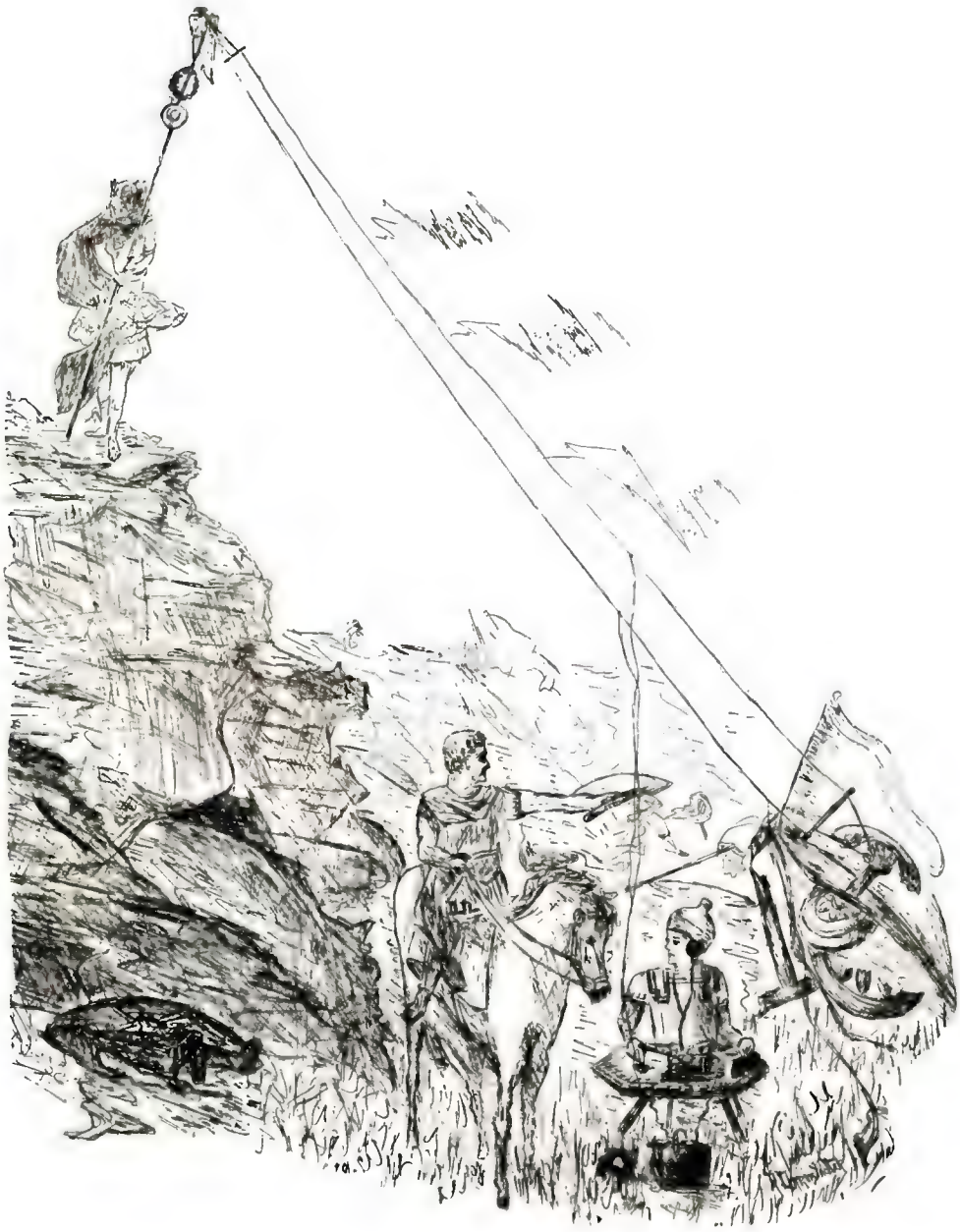
Winding.

The inductance coil has been calculated upon the assumption that double cotton covered wire is to be used. It is not advisable to use enameled wire on this instrument, nor should the wire be varnished after it is wound. Either of these measures will greatly increase the electrostatic capacity between the successive convolutions of the coil, and thus decrease the efficiency of the instrument There is no objection, however, to varnishing the core and allowing it to thoroughly dry before winding, but the wire should be left just as it comes from the spool.



"As It Might Have Been"

No. 2



Cæsar Sending His Famous Wireless Message, "Veni, Vidi, Vici," to the Roman Senate.

This department has been started with the idea to encourage the experimenter to bring out new ideas. Every reader is welcome to contribute to this department, and new ideas will be welcomed by the Editors. WHEN SENDING IN CONTRIBUTIONS IT IS NECESSARY THAT ONLY ONE SIDE OF THE SHEET IS USED. SKETCH MUST INVARIABLY BE ON A SEPARATE SHEET NOT IN THE TEXT. The description must be as short as possible. Good sketches are not required, as our art department will work out rough sketches submitted from contributors. IT IS THEREFORE NOT NECESSARY FOR CONTRIBUTORS TO SPEND MUCH TIME IN SKETCHING VARIOUS IDEAS. When sending contributions enclose return postage if manuscript is to be returned if not used. ALL CONTRIBUTIONS APPEARING IN THIS DEPARTMENT ARE PAID FOR ON PUBLICATION.

NOTICE.

The editor desires to call especial attention to contributors of the Experimental Department that this magazine is not a Wireless Magazine exclusively, but rather is intended for all branches of the Electrical Art.

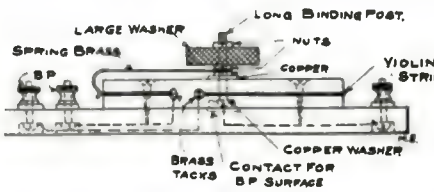
Of late the Editor has received too much material on Wireless, which is not the policy of the Experimental Department, and he calls attention to the fact that he much rather would have other articles than those on Wireless topics. Of course, original ideas on Wireless are welcome, but in as much as lately too many articles on Detector Stands, Sliders, Helix clips and the like have been received, the Editor desires to be understood that such contributions cannot be accepted hereafter unless the ideas are of absolute originality and have exceptional merit. Prospective contributors should look over at least 6 to 10 back numbers of MODERN ELECTRICS, and they will find that nearly everything on such devices as just mentioned, has been covered already, and for this reason, cannot be republished again. To encourage other branches besides Wireless, the Editor will award two monthly prices for the best idea, one of $2.00, and one of $1.00 for the best contribution. Mechanical ideas, that is, those which are of immediate interest to the Electrical Experimenter will, of course, also be considered.

Contributions should be accompanied by a photograph of the device, if possible, which increases the value of the contribution considerably.

ROTARY POTENTIOMETER.

The material needed is a hard wooden disk varnished, 3 to 4 in. in diameter, ¾" thick. Base, 5" x 5" x ¾" hard wood; three battery binding posts; one extra long B. P. and 3 nuts to fit; 2 brass tacks; on piese of strip brass 4 to 5 x ½" x 1-16"; extra large fibre washer; two copper washers to fit long binding post; brass slug, and a violin string, the kind covered with German silver wire which can be obtained at any musical supply store.

Through the center of the disk drill a hole just large enough to admit long binding post, countersink one end so that one



copper washer will fit therein and be level with the surface. Now around the edge of the disk in the middle cut a V-shaped groove to admit the violin string; then drill two holes to admit two flat headed screws to hold disk to base. When this is done take violin string and fasten one end to a brass tack, press the tack firmly in the middle of the groove and stretch the string nearly around and fasten with the other tack; then cut off the extra string. Now insert one of the brass washers in the hole and then the long binding post, the other washer goes on the other end of binding post, then a nut, the strip brass which has been shaped as shown, then another nut, after which tighten up, next come the large fibre washer, and the last nut.

Then raise the end of the strip-brass so it will rub on the wire of the string.

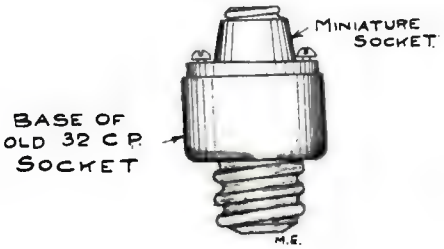
Now drill a hole in the center of the base for the contact slug so it will be far enough below the surface to allow the head of the binding post to rest snugly on it. Fasten a wire under it and run to a binding post in the base. Screw down the disk and connect the tacks to binding post as shown. This Potentiometer is of course inductive, but will be satisfactory for experimenting.

Contributed by

EDWARD HUTCHINSON.

HANDY ADAPTER.

To make a handy adapter, often needed to screw a miniature base lamp into a standard socket, take an old 32 cp. lamp and break away all the glass and cement, leaving the copper wires intact. Take a miniature socket and wedge



it in the old base, bring the wires up through screw holes in base and connect to the binding post on same.

Contributed by

T. R. MAHAN.

HOW TO MAKE A SIMPLE FIXED CONDENSER.

A great many amateurs desire a cheap and simple way to make a fixed condenser. In the following article the writer will endeavor to explain how to make a simple fixed condenser:

Procure a cigarette box, which is generally 2½ inches long, 1½ inches wide, and ½ inch thick, and cut two holes as per sketch 1. Then get:

Two sheets tinfoils 1½ wide and 12 inches long.

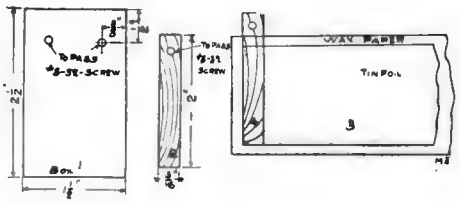
Two sheets waxpaper 1¾ inches wide and 12½ inches long.

Two srtips copper foil 5/16 inch wide and 2 inches long. See sketch 2.

A small quantity of white shellac.

For best results see that there are no pinholes in the wax paper.

Take one sheet of wax paper, put shellac on same, then a smooth sheet of tinfoil, take a strip of copper foil, place it on the end of the tinfoil (See 4), fold over once to insure good contact, go over the same work again. Put a sheet of wax paper on, shellac, place another sheet of tinfoil, place the copper strip



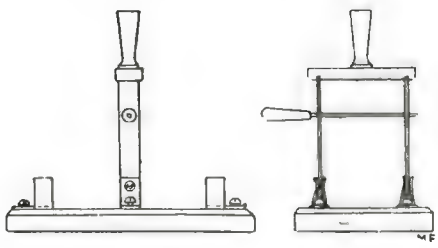
(2) on the opposite side, fold tinfoil over the strip, place a piece of cardboard 1½ x 1¾ inches on one end, then fold it. You will find by folding it 8 times that the two strips do not touch but leave a distance of ⅞ inch, which just fits into the box (1). Test out before putting in box. Rubber binding posts will make a good appearance on same, also give it a coat of black shellac, fill same up with paraffine. Get a number of your wireless friends together and make six or twelve at once, and the cost of same will be very small. The capacity equals .0145 M. F.

Contributed by

JULIUS KAUFMAN.

SIMPLE LIGHTNING PROTECTOR

The illustrations show a suitable lightning grounder made as follows: Bore



two holes, one on each knife of switch, take a wire same size as the two holes, put a handle on and insert in hole. This can be handled quite quickly.

Contributed by

ARTHUR ERICSON.

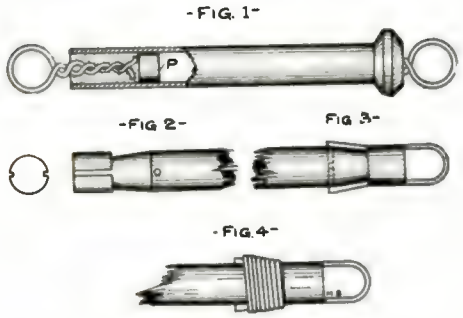
WIRELESS INSULATORS.

As I have received so many valuable suggestions from the columns of MODERN ELECTRICS, it is only fair to give a few ideas in return. Many of us amateurs are hampered in our experiments by using make-shifts that give more or less trouble.

The various devices suggested as aerial insulators, while possessing considerable merit have failed to give complete satisfaction, so I offer one that I have tested and found to fill the conditions.

Wiring cleats, though good, were not entirely successful. Ball insulators like those used on trolly lines would not stand the high voltages.

Porcelain tubes with iron rings cemented into the ends served admirably but failed in wet weather, due to the fact that



cement absorbs moisture. A search was made for a cement that would not absorb moisture, possess the necessary strength, and that could be readily used by the amateur. Sulphur was found to possess the necessary qualities and was used as shown in Fig. I. P is a plug of cotton, wood or cork to limit the space filled with the sulphur.

The ring was made by looping a No. 10 galvanized wire around a ½" rod or one of the ½" by 8" porcelain tubes used for the body of the insulator. The ends of the wire are twisted together to form a stem 2" to 2½" long. The stem is then inserted into the end of the tube and the space filled with melted sulphur. Care should be taken to see that the tube is kept filled as sulphur contracts on cooling and deep pits might result.

Insulators made in this way have easily stood strains of 200 pounds without pulling apart, though the wire rings were badly distorted.

When the aerial is ready to raise, if the experimenter will carefully clear all dirt from the surfaces of the insuators with a clean piece of emery cloth, the insulators will stand a greater electric strain and better results will be obtained.

As a strain insulator for guy wires I use hard wooden rods about 2 feet long by 1" to 2" diameter, with ends shaped as shown in Fig. 2. The tapered portion should be about 1" to 2" long, and 1" from each end. Slots are cut then each side to the end for the No. 6 galvanized wire used for the loops. A hole is bored through the stick and the ends of the No. 6 wire are thrust into it as indicated in Fig. 3. Fig. 4 shows the end completed by a winding of No. 14 galvanized wire. If desired the wooden rods may be boiled in paraffine or painted with some good weather proof compound.

Insulators of this type are of sufficient strength and offer sufficient insulation for the guys on any pole or tower the amateur may desire to use.

Contributed by

OREN L. GRUBBS.

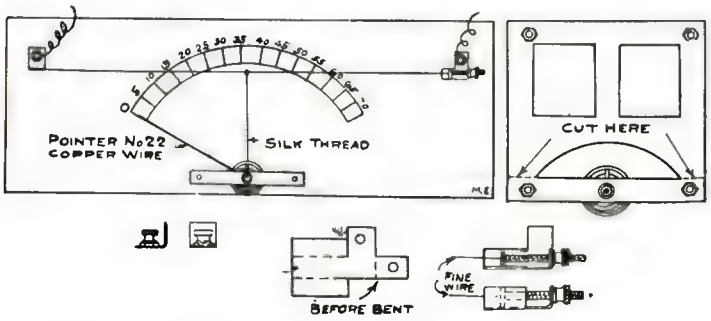
DISTANCE COMPUTER.

The illustration shows an idea that has turned out very handy to me. I got a map of the New England States and marked a big red dot on all the cities and locations where the most important wireless stations are. Then, I fastened a pointer by a brass tack to the town in which I live, having previously divided

the pointer off in 10-mile sections by means of the chart on the map. By means of swinging the pointer around to the station I hear, I can get the distance in a few seconds.

Contributed by

L. ALDRICH.



A SIMPLE HOT WIRE AMMETER

I made a baseboard of white wood 4" x 13" x ½". I took the works out of an old alarm clock, and with a pair of snips cut off the side containing the balance wheel as per sketch.

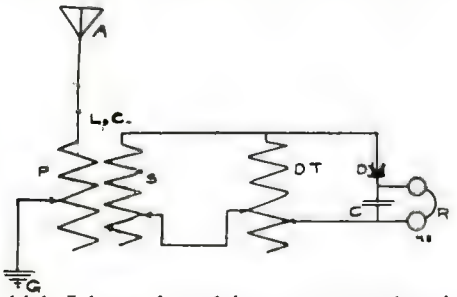
I cut two pieces of brass in shape shown and bent them on dotted lines. I then fastened them to baseboard with battery screws and nuts. I soldered a No. 40 wire to brass piece of left and to battery screw with sides of head filed off, placed through hole in right hand brass piece and thumb nut screwed on. This serves to tighten the wire and bring the pointer back to zero. I now fastened a silk thread to the balance wheel and wound it around the axel several times, then brought it up and tied it around the fine wire. The spring on balance wheel serves to swing the pointer to the right while the thread fastened around wire holds it at zero; when the wire heats and slacks up, the spring swings the pointer over the scale.

Contributed by

PERCY W. YORK.

SELECTIVE CONNECTION.

Illustration shows the diagram of a very selective and sensitive connection



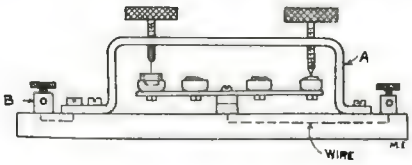
which I have found in my researches in the wireless field.

Contributed by

H. W. DENSHAM.

IMPROVED DETECTOR STAND.

Seeing an article in MODERN ELECTRICS for September, describing a Universal Detector, I made one and find that it gives very fine results and saves the building of 5 or 6 separate ones. I find, however, that this can be improved by substituting a different bracket as per illustration, which allows one to use two different metal points or the cup from an Electrolytic Detector can be fastened to the wheel and the Platinum wire held in the other arm which saves a good deal of time when one wants to change from one detector to the other. If the bracket is made in one piece as per sketch the wir-



ing will be the same as you showed in the September number, but if the bracket is made in two separate pieces a wire will have to be run from A to B, the size will be the same except the base which will have to be a little longer.

Contributed by

PETER J. THEISEN.

AN EASILY CONSTRUCTED LEYDEN JAR.

Procure a mason fruit jar, with metal top, any size: One brass rod ⅛ in. in diameter and 2-3 the length of the jar; one strip of either brass or copper, ¾ in. in width and long enough to reach around body of jar, with 2 in. to spare for clamping; one strip about same length, ¼ in. wide, of thin spring copper or brass; tinfoil to line and coat jar, and two binding posts.

Assemble as per drawing.

A—⅛ in. brass rod, soldered at middle to center of jar cover C.

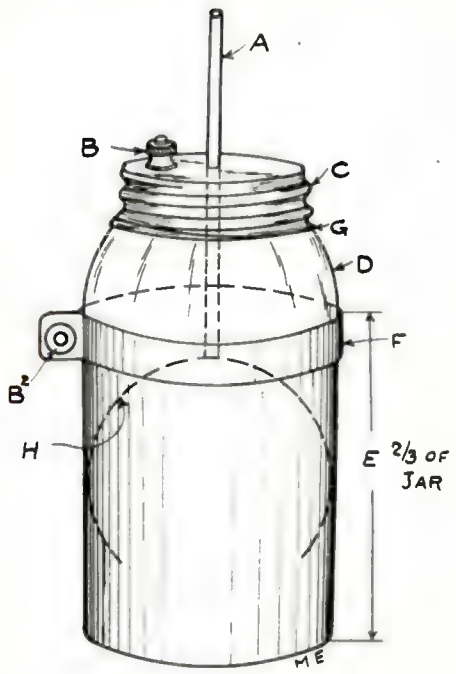
B—Binding post inserted through cover.

D—Jar, which is lined and coated on bottom and 2-3 of the height, with tin-foil, as shown at E.

F—¾ in. copper strip, which covers the top edge of tin-foil, gives it a neat appearance, and also serves as contact. This is made at binding post B-2, which also serves to clamp strip in position.

G—Rubber washer.

H—¼ in. copper strip which is bent and soldered to end of rod A, as shown by dotted lines in drawing. This strip should be very thin, so it will not scratch the tin-foil on inside of jar, while screwing on top.



The jar, after being assembled, must be shellaced or varnished.

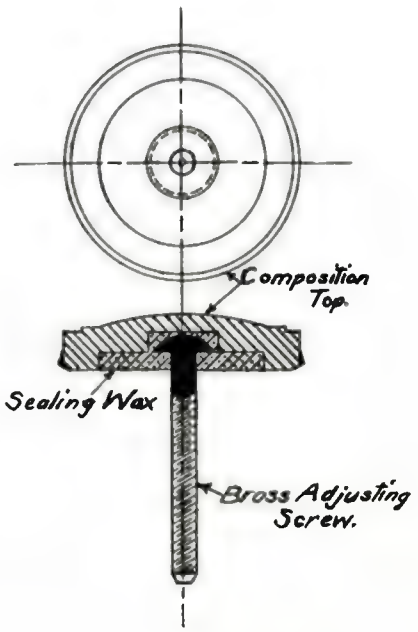
Contributed by

PERCY TOWNSEND.

INSULATED THUMB NUT.

Remove the composition top from the cork of a "Sanford's Ink" bottle, carefully cleaning away all traces of cork and cement. Now with a ⅜" drill, bore a hole a short distance (about ⅛"), into the *exact* centre of the recess in the top, which the cork formerly occupied.

Now take a battery binding post, or an adjusting screw of any size, and set the head into the above hole so that the screw



stands *exactly* at right angles with the insulating top or else it will not turn true when using it for adjusting. Now pour in some sealing wax.

After the latter has become perfectly hard, finish it off with sandpaper or an old file.

This method of arranging the screw can be plainly seen by studying the accompanying sketch; and if carefully followed it is found to be much superior to using sealing wax alone to insulate the screw, as described in previous issues of MODERN ELECTRICS.

This insulating nut will not soften or become sticky from the heat of the hand or from other external heat, and will also withstand more severe usage than one made completely of sealing wax.

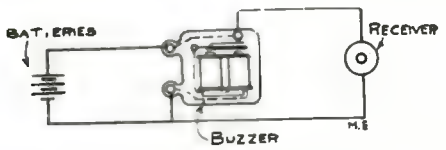
Contributed by

G. E. RUDOLPH.

NOVEL ALARM.

Enclosed please find a suggestion of a substitute automobile horn. If you have not an automobile horn don't get discouraged. This outfit will give a loud noise which can be heard some yards

away. The things needed are one telephone receiver, eight dry cells and any kind of buzzer, the faster and louder the



vibrations, the better. The whole is connected as in the following diagram.

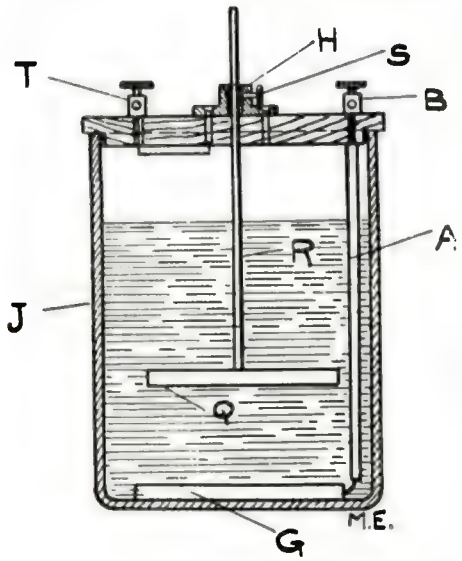
Contributed by

FRED BESSERER.

A WATER RHEOSTAT.

In order to prevent too much current from flowing into the transformer or other apparatus, it is necessary to have a suitable resistance in series. The one here described has served its purpose well.

Obtain a glass jar or a glazed crock, holding about a gallon of water. See illustration for details of construction. Cut two pieces of lead, G and Q, to fit in the jar, making Q a little smaller than G; and to G solder a piece of Pirelli rubber cable, A, and attach it to the binding post, B. Prepare a slate cover for the jar on which the binding posts T and B, and the brass bearing, H, are placed.



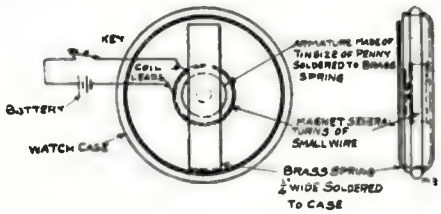
Solder a lead rod one-eighth of an inch in diameter to the plate Q. Prepare a brass bearing H with a thumb screw S, so that the rod R can slide freely in H, and fasten in any position by tightening the thumb screw S. Connect the binding post T and the brass bearing H by a No. 12 rubber covered wire. Solder the connections. If this jar be nearly filled with water in which a little salt is dissolved, it makes an excellent rheostat.

Contributed by

STANLEY E. HYDE.

POCKET TELEGRAPH SOUNDER

A good testing instrument for testing circuits and will work on slightest cur-



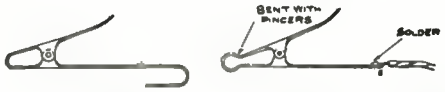
rent providing magnet is wound with fine wire. Can be carried in the pocket and gives a good sound.

Contributed by

G. A. HIGBEE.

ANOTHER HELIX CLIP.

This is a helix clip which can be easily made by anyone. A clip such as used



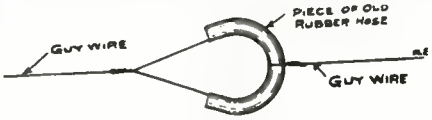
can be obtained from almost any stationer for a few cents. Shape the end of clip with a pair of pincers, as shown in sketch. Now solder a flexible conducting cord to the clip and it is ready for use.

Contributed by

STANLEY PATTEN.

NOVEL INSULATOR

Please find inclosed a sketch of a cheap and easily made wireless guy wire in-



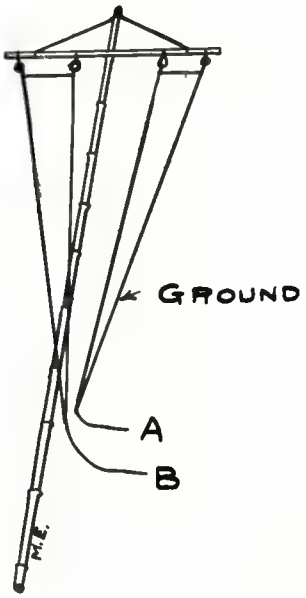
sulator. All the material used is a piece of old rubber hose.

Contributed by

EARLE S. COLLINS.

BICYCLE AERIAL.

In some places communication would be impossible with the bicycle wireless outfit described in the September issue



of "MODERN ELECTRICS," because of the poor ground. If the wire intended for a ground be led to wire A (see diagram) and wire intended for aerial be led to wire B, no trouble caused by a poor ground will be experienced.

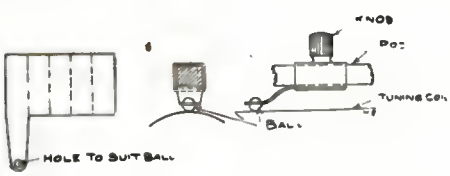
Of course any station wishing to correspond must have an aerial of the same type.

Contributed by

V. TRASK.

ANOTHER SLIDER.

Enclosed please find diagram of a slider. Procure some spring brass and



cut as per diagram, bending on dotted lines.

Contributed by

FRED BESSERER.

ELECTRIC BICYCLE HORN.

Materials needed: An old watch case receiver, an electric bell, and a base of

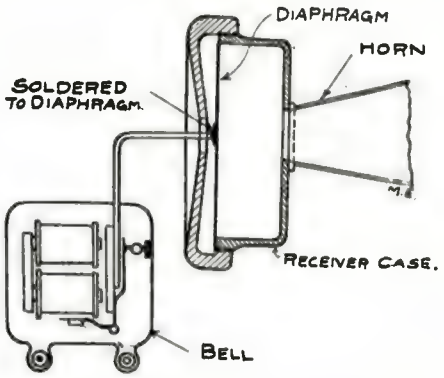
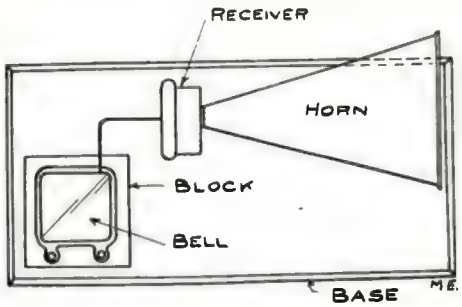


FIG 1-

any size, and a block for the bell to rest on. Now remove the magnets of receiver, and drill a hole 5/8" in the back. Next procure a tin horn at a toy store and remove the whistle on the inside, next solder the horn to the hole in the back of receiver. That having been done, replace the diaphragm and screw the cover on. Next cut the ball off of the tapper of the bell, remove the gong, and bend



-FIG. 2-

the rod back as shown in Fig. 1, then solder the end to the diaphragm, attach to 2 dry cells and it is complete as in Fig. 2. This horn will give a very loud noise. The gong should be left off.

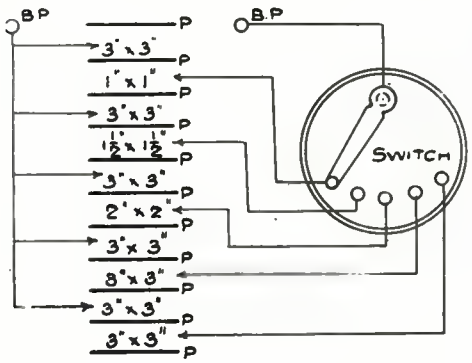
Contributed by

WM. RYAN.

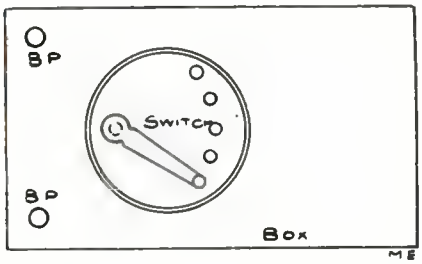
A GOOD RECEIVING CONDENSER.

The necessary materials for this condenser are: A pound of tin-foil, a pound of paraffine paper; a flat cigar box; two

binding posts; a five-point switch, and insulated wire.



-FIG 1-



-FIG 2-

Cut 11 sheets of paraffine paper the size of the cigar box. Cut 7 sheets of tin-foil 3″ x 3″; 1 sheet 1″ x 1″; 1 sheet 1½″ x 1½″, and 1 sheet 2″ x 2″. Lay the sheets alternately in the box and wire as shown in Figure 1. The lines P represent sheets of paraffine paper, and the numbers, the sheets of tin-foil. Mount the switch and binding posts on the cover of the box as shown in Fig. 2.

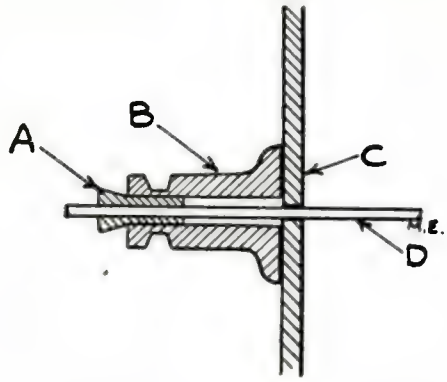
Contributed by

RICHARD PICARD.

HINTS FOR EXPERIMENTERS.

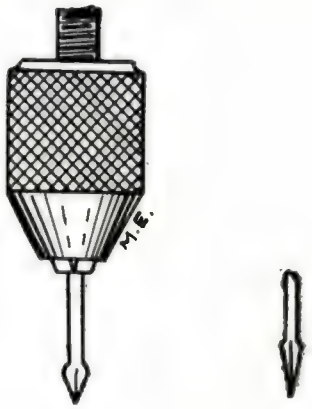
I have had considerable trouble and expense in making my static machine plates run true until I hit on this idea. The plate C has a hold drilled in it the same size as the shaft. The boss B has a large hole drilled all the way through and is fitted with a plug A, which has a hole in its center. By turning this plug around a point may be reached where the plate will run true. The boss is fastened to the plate with shellac dissolved in alcohol which is very strong and durable.

The hole may be drilled in the glass with the kind of drill shown in Fig. 2.



-FIG. 1-

It is highly tempered and has sharp edges. The *stationary* handle of the hand



-FIG. 2-

drill is rotated from time and greatly helps drilling. The hole is started with a glass cutter.

-FIG. 3-

A very good method of making sol-

dered connections on a small commutator is shown in Fig. 3. The wires are first cut to length and soldered to the copper segments and then the segments are fastened to the commutator with shellac and tied down till dry.

Contributed by

LOREN GAY.

IMPROVED SLIDER.

Enclosed is a description of a slider

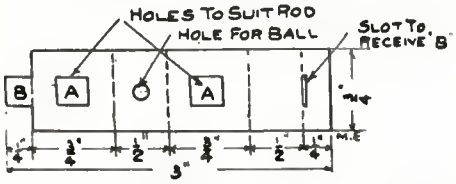


FIG. 1

similar to the one of the August issue. As to the illustrations 1 is a strip of brass

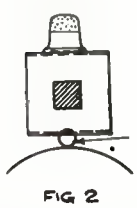


FIG 2

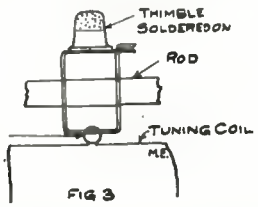


FIG 3

3 inches long by ¾ inches wide, bent on the dotted lines into the form of Fig. 2. Fig. 3 shows action of ball on the coil.

Contributed by

JAMES KARUZA.

IRWIN TO GO ON THE STAGE.

Jack Irwin, the wireless operator on the airship America, signed a contract calling for his appearance for twenty weeks on the vaudeville stage, at $600 a week. Irwin will probably make a short speech and show the workings of a wireless set.

CONSTRUCTION OF AN EXHAUSTED COHERER.

(Continued from page 438)

By placing this coherer in the stand, in such a way that the decohering apparatus taps the coherer tube from below, to decohere the filings, and when connected through a sensitive telegraph relay, a Morse register is set to record the dots and dashes received, thus enabling the operator to read his message on the paper tape very intelligently.

Book Review

WIRELESS TELEGRAPH CONSTRUCTION FOR AMATEURS. By Alfred P. Morgan. D. Van Nostrand Company, New York; 220 pages; 153 illustrations; 12 mo. Price, $1.50.

This book by Mr. Morgan, deals with the construction of wireless apparatus for the amateur, and contains data on any instrument he might wish to make.

The theory of the operation of all the instruments is clearly and simply explained with numerous illustrations, which will appeal to the young student, who does not understand the deeper textbooks.

Complete instructions are given for constructing the transmitting equipment, such as spark coils and transformers, keys, helices, condensers, hot wire ammeters and receiving loose couplers, tuning coils, detectors, condensers, etc.

Many useful hints are given on the hook-up and operation of a wireless station, aerial construction and ground connections.

TELEGRAPHY FOR BEGINNERS By Willis H. Jones, Wire Chief of the Western Union Telegraph Co., New York. Spon & Chamberlain; 58 pages; 19 illustrations. Price, 25 cents.

A well written little book explaining the best method to pursue in mastering the art of telegraphy. Its principal aim is to develop the speed of the student and also to familiarize him with the matter handled in everyday commercial practice. Both the Morse and Continental codes are treated and several chapters devoted to sporting events, market reports, etc.

ELECTRICITY EXPERIMENTALLY AND PRACTICALLY APPLIED. By Sidney Whitmore Ashe, B. S. E E. The D. Van Nostrand Co., New York cloth; 422 illustrations; 350 pages. Price, $2.00 net.

A work adapted to the wants of the electrical student, covering thoroughly the theory and application of electricity, both direct and alternating current.

Among the subjects covered are: magnetism. Theory of the dynamo, Ohm's law, primary and storage batteries, electrolysis, electrical measurements, the

shunt motor, the series motor, the arc light incandescent illuminants, recording wattmeters and their use, elementary principles of alternating currents. The alternating current transformer, the induction motor, the rotary converter.

The author has treated his subject in a clear, concise manner, and the text is made exceptionally clear by numerous cuts showing modern electrical apparatus, and method of connecting same, for testing, operation, etc.

WIRELESS TELEPHONES AND HOW THEY WORK. By James Erskine-Murray, D. Sc. The Norman W. Henley Publishing Co., New York., cloth; 68 pages; 17 illustrations. Price, $1.00.

A manual covering the progress of wireless telephony up to the present date, including all systems. It is written in simple language, so as to be easily understood by the layman, and takes him from the theory of sound and its properties, up to the modern wireless telephone station and its working. A glossary of technical terms used is given at the end of the book.

PRINCIPLES OF WIRELESS TELEGRAPHY. By George W. Pierce, A M. Ph. D. The McGraw-Hill Book Co., New York; cloth; 350 pages; 235 illustrations. Price, $3.00 net.

This book is the latest addition to the Technical Works on wireless telegraphy, and will be found of value to every one interested in the art, from a technical standpoint. There is much new matter incorporated, including some valuable tables and curves, on day and night transmission, rectifying detectors, condensers, resonance and tuning, etc

The 28 chapters cover such interesting topics, as electrostatic capacity, the propogation of electric waves on wires, electric wave telegraphy by resonant circuits, nature of the oscillation, propogation over the earth, on detectors, crystal rectifiers, electrolytic and vacuum detectors, including their action. Electrical resonance, tuning the sending station, some recent methods of exciting electric waves, including the singing arc, the singing spark and the quenched spark, resonance of receiving circuits, the possibility of preventing interference, directed wireless telegraphy, wireless telephony, details on the construction of wireless telegraphic apparatus.

The book ends with an appendix on definitions of electrical units, and the calculation of resistance, self-inductance and capacity.

LOS ANGELES WIRELESS STATION TO BE ENLARGED.

Los Angeles is soon to become one of the largest and most important wireless marine stations in the United States.

This will be accomplished through the enlargement of the operating station of the United Wireless company at San Pedro, which will place Los Angeles in touch with Honolulu nightly, keep it in touch with the ships plying between California points and Panama, and enable it to converse with steamers 2,000 miles at sea.

POULSEN'S NEW WIRELESS LIGHT.

Valdemar Poulsen, the noted Danish inventor, has produced an apparatus for lighting electric lamps by wireless.

Recently, while an assistant stood in one room holding two lamps, the inventor went into another room and placed the transmitting apparatus in position, and on closing contacts the lamps were alternately lighted and extinguished.

There was no connection of any kind between the apparatus and the lamps.

Marconi in Argentina reports that he has received signals from Ireland 5,600 miles distant, by his wireless system.

A Dry Battery.—*Judge.*

Wireless Telegraph Contest

Our Wireless Station and our Laboratory Contest will be continued every month until further notice. The best photograph for each contest is awarded a monthly prize of Three (3) Dollars. If you have a good, clear photograph send it at once; you are doing yourself an injustice if you don't If you have a wireless station or laboratory (no matter how small) have a photograph taken of it by all means. Photographs not used will be returned in 30 days.

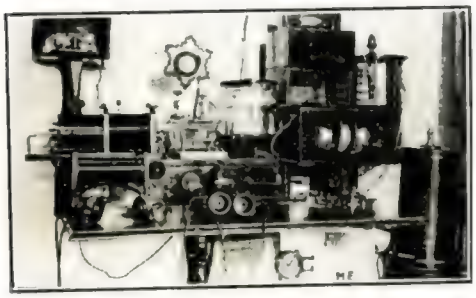
PLEASE NOTE THAT THE DESCRIPTION OF THE STATION MUST NOT BE LONGER THAN 250 WORDS, AND THAT IT IS ESSENTIAL THAT ONLY ONE SIDE OF THE SHEET IS WRITTEN UPON. SHEET MUST BE TYPEWRITTEN OR WRITTEN BY PEN. DO NOT USE PENCIL. NO DESCRIPTION WILL BE ENTERED IN THE CONTEST UNLESS THESE RULES ARE CLOSELY ADHERED TO.

It it also advisable to send two prints of the photograph (one toned dark and one light) so we can have the choice of the one best suited for reproduction.

This competition is open freely to all who may desire to compete, without charge or consideration of any kind. Prospective contestants need not be subscribers for (the publication) in order to be entitled to compete for the prizes offered.

FIRST PRIZE THREE DOLLARS.

Enclosed please find photo of my wireless station with which I have had perfect success in working with other stations, sending and getting signals loud and clear. At the left is the receiving set,



which consists of a double slide tuning coil, loose coupler, tubular variable condenser (back or loose coupler), ferron, silicon and perikon detectors, two fixed condensers under detectors and two sets of receivers of 2,000 ohms each. Have tuning coil and loose coupler wired so that I can cut each of them in separate, or both in at the same time.

My sending equipment at the right of picture consists of a six-inch sparkcoil, variable condenser just back of it, spark gap on top of condenser with glass front in muffler box, helix at right, and interrupter at left of condenser, Tesla coil at right of table.

All of the sending, and nearly all of the receiving instruments I made and finished up with walnut and mahogany, as per instructions derived from MODERN ELECTRICS.

The aerial switch is a combination double-throw five-point, arranged so that it short circuits the detectors and cuts in sending current; and also a switch for cutting in one or both sets of receivers.

My aerial is composed of 6 No. 12 aluminum wires. 86 feet long, 3 feet apart and fifty-five feet above the ground at each end, and is constructed on the plan of a flat T, with six 35-foot aluminum leads running from middle of aerial to a single copper lead.

W. H. SMITH,
Denver, Colorado.

HONORABLE MENTION.

Please find enclosed a photograph of my wireless station.

The aerial is composed of four strands of No. 8 copper wire, 50 feet long, 2 feet apart; 50 feet high at one end and 30 feet at the other.

The receiving set I made myself, except the 2,000-ohm E. I. Co's. phones. It consists of a loose coupler, variable

and fixed condensers, which are enclosed. I use silicon and perikon detectors.

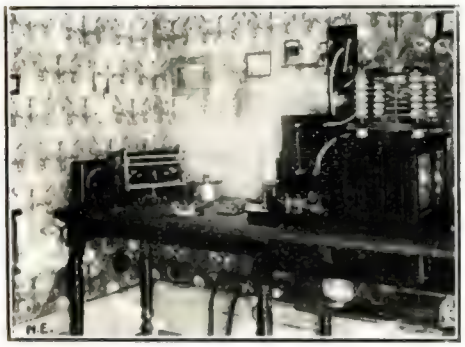
The sending set consists of an E. I. Co's. ½ kilowatt spark coil and spark gap helix combined. It is wound with No. 3 brass wire and this I made myself. I use E. I. Co's. adjustable Leyden jar condensers, key and D. P. D. T. switch.

THEO. J. KORTLANDER.
Grand Rapids, Mich.

HONORABLE MENTION.

Enclosed please find photograph of a wireless outfit owned by Mr. U. C. Young, of this city and myself. The helix, coils, condensers and everything

with the exception of the 800-ohm polarized relay and telephone receivers was built by Mr. Young and myself. The helix was made by myself about two years ago after an illustration in your magazine. The sending instruments are controlled by two heavy contact keys one on each side of the table, the receiving instruments on the right being mine, those on the left belonging to Mr. Young. The relay set seen in front of the coils is only



used as call-bell and is run off the A. C. mains, using an eight-C. P. light for resistance. The two coils seen in the center of the photo consume about one and a half K. W. and give a five-inch spark when connected in series. This spark at three inches will fuse a number twelve copper wire, if used without a condenser. The coils are wound with number twelve wire on the primary and have 5 and 6 pounds, respectively, of number 30 wire, enamelled, on the secondary section. The Wehnelt Caldwell interrupter and choke-coils may be seen under the table, also on the extreme left a buzzer for testing. The receiving instruments seen on the left are of the close coupled type, using two variable condensers, with mica insulation. The receiving instrument on the right can be used either as a close-coupled or loose-coupled set; the four-pole double-throw knife switch seen on the base controlling same. This set also uses two variable condensers. So far we have tried out every detector that we ever heard of, but have come back to the E. I. Co. electrolytic and our silicon. Our aerial extends from my house to a pole in the rear, a distance of 105 feet, and is composed of 4 No. 12 hard-drawn copper wires five feet apart, the higher pole being 61 feet high, and the two house poles 48 feet high.

I shall try and send in description of my wireless telephone set as soon as possible. This has been added to the above set and is not shown, as this picture was taken about two months ago.

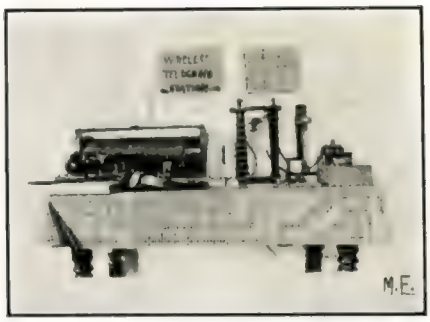
I have been working with wireless for about five years, and up to the time that MODERN ELECTRICS was first published was literally groping in the dark as far as loose-coupling was concerned, so that I can truthfully say that without it my set would not be what it is.

C. L. SEARS,
St. Louis, Mo.

HONORABLE MENTION.

Please find enclosed photo of my wireless tation. The aerial is made up of four No. 14 aluminum wires, 50 ft. long, 50 ft. high.

The sending apparatus consists of a one-inch coil, helix, wound with 25 ft. of copper wire; the condenser is of 3-tube type, zinc spark-gap with muffler, 3 storage batteries and E. I. Co.'s key.



Receiving set consists of 1,000 meters single slide coil, electrolytic and silicon detectors, fixed and variable condensers, 2 100-ohm receivers and potentiometer.

MODERN ELECTRICS is a fine monthly for anyone interested in wireless telegraphy. ARTHUR ERICSON.

HONORABLE MENTION.

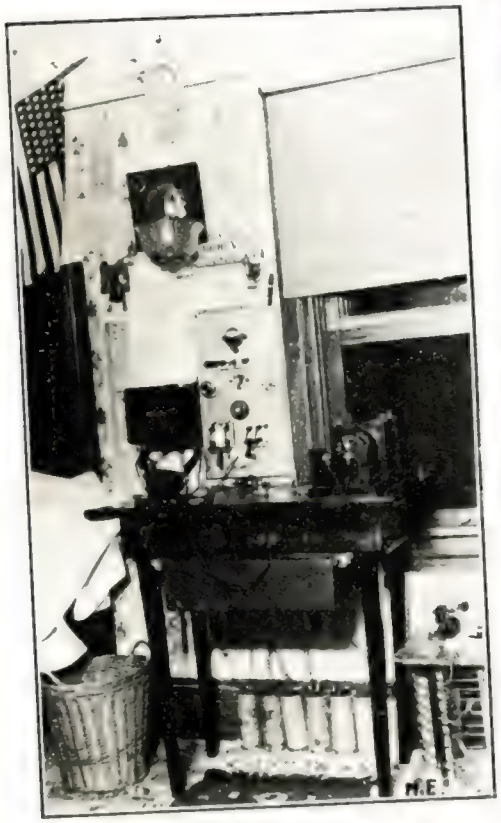
Enclosed please find photo of my wireless set. The set comprises the following:

Receiving:—Loose-coupling tuner (to the right), which was made by F. Chambers, of Philadelphia, silicon and pericon detectors, fixed and variable condensers, which I made; one pair 1,000-ohm Holtzer-Cabot receivers.

The sending end consists of one one-half inch coil, helix, key, condensers, E. I. Co. spark gap and batteries.

The switch board has been improved since the picture was taken. I have now instead of the 2 D. P. S. T. switch a large aerial switch of my own design and construction, also many other minor improvements. With this set I have heard Cape Cod quite plainly, while Wilmington can be heard all over the room.

I have taken MODERN ELECTRICS for a



long time, and consider it the best electrical magazine published.

GEORGE T. CUSTER,
New Jersey.

HONORABLE MENTION.

I am sending you a photograph of my wireless telegraph equipment, which consists of the following: A small aerial 62 ft. long and 65 ft. high, made of No. 14 copper wire. I use silicon and carborundum detectors, E. I. Co.'s fixed condenser, tuner, loose coupler and 2,000-ohm phones. For sending a 1-inch coil, helix, electrolytic interrupter and Leyden jar condenser is used (sending set not shown in photo).

I have been studying wireless telegraphy for three years and have made

and used many different styles of instruments and am still experimenting. I am a reader of MODERN ELECTRICS and derive valuable information from its contents.

ARTHUR M. GREENWELL,
Santa Barbara, Cal.

HONORABLE MENTION.

Enclosed please find a photograph of my wireless station with which I have transmitted successfully up to eight miles and received up to one thousand miles. I am a member of the "Wireless Association of America" and have been experimenting with wireless for about two years.

The sending set consists of a one-inch induction coil, a condenser, helix, spark gap, and a Morse Key. An eight-volt,

120-ampere hour storage battery supplies the current for transmitting.

The receiving instruments consist of a double slide tuner, silicon detector, a fixed condenser, a rotary variable condenser, and a pair of 3,000-ohm navy type phones.

The aerial is made up of four aluminum wires, three feet apart, 58 feet in length, suspended between two masts, the highest being 70 feet, and the other 65 feet above the ground. To my aerial is attached a four-wire take-off which is over sixty feet in length, giving my antenna a large capacity.

With this set I am able to receive messages from anywhere along the Atlantic coast from Cape Cod, Mass., to Key West, Florida, and as far inland as Buffalo, N. Y., and also from ship at sea.

Without the aid of MODERN ELECTRICS I never would have obtained the results that I am getting now, as this magazine keeps me in touch with the progress of the wireless world.

LOUIS DIETERICH,
Washington, D. C.

HONORABLE MENTION.

Enclosed find a photo of my wireless station and a description thereof.

Receiving:—One double slide tuning coil, two variables, rotary type and E. I. Co.'s slide plate type, three fixed condensers, E. I. Co.'s potentiometer and batteries, five detectors. E. I. Co.'s electrolytic, silicon, carborundrum, molybdenite, and microphone, pair of E. I. Co.'s 3,000-ohm receivers with plug attachment.

Transmitting:—The current used for sending is obtained from a 6 V. 40 A. H. storage battery. I use an E. I. Co.'s 1-inch spark coil, zinc spark gap, helix of 14 turns No. 8 brass wire, and a sending condenser, consisting of 4 glass plates 12x 12 in., with tinfoil on both sides, 9x9 in. A Morse telegraph key is used to break the primary current.

Aerial:—Consists of 20 strands No. 14 B. & S. gauge copper wire, each 100 ft. long, on a 20-ft. spreader, making over 2,000 *ft. of aerial wire.* The aerial is suspended from an 85 ft. pole from the ground to a flag pole on my house fifty ft. high.

With the above set I can hear the Tatoosh Islands and the stations about it down the coast as far as Pt. Loma. I hear the Universal Wireless Telephone Stations talking with each other remarkably well. It is quite interesting when they put the phonograph on the telephone and play some band selection or song.

My call letter is T. J. M.

EDWARD THOS. JORGENSEN,
San Francisco, Cal.

Wireless Registry

	Call.	Wave Length.	Spark.
Ball, Alice A., Seattle, Wash.,	A.B.	100	1 ins
Bolle, H. A., New York City,	H.A.7	180	3 "
Bewald, W. E., Davenport, Ia.,	W.B.	165	½ K.W.
Barrett, John G., Jr., Boston, Mass.,	J.G.B.	160	¼ ins.
Eaton, Louis, W., Calais, Me.,	L.W.E.	65	1 "
Elyria Telegraphy School & Wireless Supply Co., Elyria, Ohio,	E.T.W.	165	2 "
Franny, Glen., Beloit, Wis.,	M.S.A.	120	¼ K.W.
Jaeger, C. L., Mahwah, N. J.,	C.L.J.	400	8 ins.
Lowe, S. K., Oakland, Cal.,	S.P.G.	110	½ K.W.
Parsons, John L., Rye, N. H.,	J.P.	150	1 ins.
Robinson, F. O., Spokane, Wash.,	F.O.R.	200	¼ K.W.
Shannon, J. P., Los Angeles, Cal.,	S.I.M.	210	2 "
Stokes, W. E. D., Jr., No. Long Branch, N. J.,	X.X.	400	2 "
Stokes, W. E. D., Jr., Hotel Ansonia, N. Y. City,	X.	400	10 "
Sedgwick, Geo. H., Mt. Vernon, N. Y.,	G.H.S.	80	3 ins.
Weddell, Horace A., Chicago, Ill.,	H.A.W.	310	2 "

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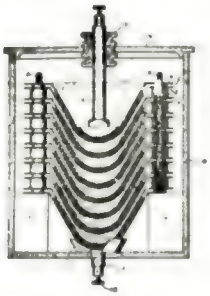
Electrical Patents for the Month

974,029. ELECTROLYTIC CONDENSER. ELMER E. F. CARRINGTON, Schenectady, N. Y., assignor to General Electric Company, a Corporation of New York. Filed Oct. 26, 1907. Serial No. 399,272.

1. A compound plate for an electrolytic lightning arrester, consisting of two aluminum plates, and insulation interposed between their central portions only, having their edges free to be electrically connected



971,667. ELECTRICAL CONDENSER. WILLIAM W. DEAN, Elyria, Ohio, assignor to The Dean Electric Company, Elyria, Ohio, a Corporation of Ohio. Original application filed Jan. 28, 1909, Serial No. 474,772. Divided and this application filed Oct. 25, 1909. Serial No. 524,310.

1. In an electrical condenser, the combination of strips of insulating material, one adapted to act as an insulator at low voltages, but adapted to be punctured at high voltages, thin layers of conducting material each deposited upon a surface of one of said strips, said thin layer of conducting material adapted to be dissipated at the punctures to isolate said punctures from the remainder of the layer and a strip of metallic foil of relatively low resistance, all wound together in a roll, such strips of insulating material and metallic foil being so disposed relative to one another that two of said conducting layers are in contact and both are separated from a third by a strip of insulating material

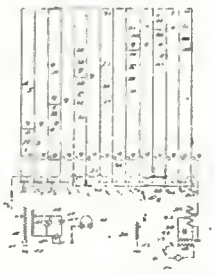
972,715. TELEPHONE RECEIVING APPARATUS. GELASTUS WHITFIELD PICKARD, Amesbury, Mass. Filed Mar. 16, 1910. Serial No. 549,688.

1. In a telephone receiver, the combination with a magnet, of a winding therefor, electrically separate therefrom in respect of ordinary telephone currents; and means for protecting the winding from discharges of excessive potential to the magnet, said means consisting of a spark gap constituting a break down path for such discharges between the magnet and an uninsulated part of the circuit of the winding

972,929. METHOD OF AND APPARATUS FOR GENERATING ELECTRICITY. BODO SCHWEDTMANN, Frankfort-on-the-Main, Germany. Filed May 12, 1909. Serial No. 496,519.

1. The herein described process of generating electric currents which consists in forcing an electrolyte through a capillary substance, and collecting the electricity from said substance, using as an electrolyte a basic substance, when the capillary substance is an electronegative body.

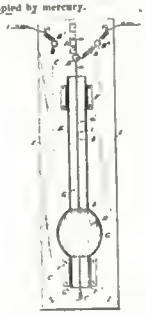
972,004. ANTENNA. ROBERT H. MARRIOTT, Brooklyn, N. Y., assignor to The United Wireless Telegraph Company, New York, N. Y., a Corporation of Maine. Filed Apr. 8, 1910. Serial No. 554,294.



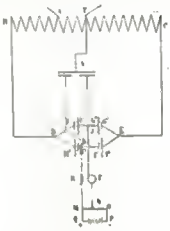
1. In a wireless telegraphic apparatus the combination of a sending means; a receiving means; a plurality of receiving antennæ of different inductances and capacities, and, therefore having different natural periods connected to said receiving means; and connections with said sending means by which said antennæ may be employed as a single antenna when sending, substantially as described.

972,064. THERMIC CIRCUIT CLOSER FOR ELECTRO-MAGNETIC APPARATUS. GARRETT WHITE, Chapel Hill, Tenn., assignor of one half to William B. Neely, Chapel Hill, Tenn. Filed Sept. 2, 1909. Serial No. 516,887.

1. A thermic circuit closer for an electric circuit having, in combination, an open-topped glass tube constructed with a mercury-chamber expansion near its lower end, a lining of a material absorbent of dampness and non absorbent to mercury within the main body of said tube including its upper end, a lower contact wire sealed within the lower end of the tube, and an endwise movable needle extending into the upper end of said lined tube; said expansion and the lower end of the lined portion of the tube being occupied by mercury.



972,721. WIRELESS TELEGRAPHY OR WIRELESS TELEPHONY. OCTAVE ROCHEFORT, Paris, France, assignor to Compagnie Générale Radio Telegraphique Carpentier, Gaiffe, Rochefort, Paris, France. Filed Nov. 8, 1909. Serial No. 526,794.



1. In a wireless telephone or telegraph receiver, an oscillation circuit having two parallel branches, a pair of electrolytic rectifiers in each branch, arranged in opposition, and a receiving circuit, tapping each branch between said rectifiers, said circuit including a source of continuous current and a signaling device

971,737. VENT-TUBE FOR STORAGE BATTERIES. MELCHER EKSTROMER, Cambridge, Mass., assignor to Joseph C. Kent, trustee, Boston, Mass. Filed Mar. 31, 1909. Serial No. 486,836.

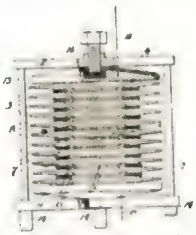
1. A storage battery vent-tube provided with a vent in its upper end for the escape of gases from the battery and a plunger inclosed within said tube and constructed and arranged to rise and thereby close said vent by the impact of the liquid of the battery against said plunger

2. A storage-battery vent-tube comprising in combination a cap having a chamber therein, said cap being se-

973,644. AEROPHONE. LEE DE FOREST, New York, N. Y., assignor, by mesne assignments, to De Forest Radio Telephone Co., a Corporation of New York. Filed Nov. 12, 1906. Serial No. 342,964.

1 In a system for transmitting articulate speech by free and unguided electro-magnetic waves, an elevated conductor for radiating said waves a singing arc circuit connected to and operating to create high frequency electrical oscillations in said elevated conductor, and means associated with said circuit for varying the amplitude of the oscillations therein by and in accordance with sound waves

971,937. SPARK GAP FOR RADIOTONE WIRELESS TELEGRAPH SYSTEMS. EMIL J. SIMON, New York, assignor to The Radio Telephone Company, New York, N. Y., a Corporation of New Jersey. Filed Mar. 17, 1910. Serial No. 549,974.



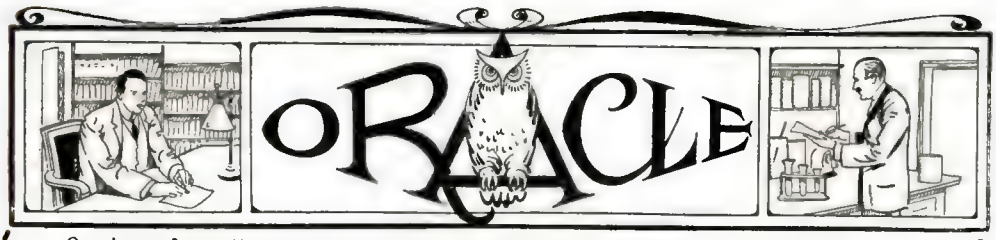
1. In an apparatus for producing powerful electrical oscillations, a plurality of electrodes having soft rubber gaskets interposed therebetween

973,557. INSULATING MATERIAL. CHARLES F. PEARSON, Schenectady, N. Y., assignor to General Electric Company, a Corporation of New York. Filed June 22, 1907. Serial No. 380,226.

1 An insulating material consisting of fragments of mica pasted together by a material comprising kaolin and silicate of soda

Original Electrical Inventions for which Letters Patent Have Been Granted for Month Ending Oct. 28

Copy of any of the above Patents will be mailed upon receipt of 10 cents.



Queries and questions pertaining to the electrical arts addressed to this department will be published free of charge. Only answers to inquiries of general interest will be published here for the benefit of all readers. Common questions will be promptly answered by mail.

On account of the large amount of inquiries received, it may not be possible to print all the answers in any one issue, as each has to take its turn. Correspondents should bear this in mind when writing, as all questions will be answered either by mail or in this department.

If a quick reply is wanted by mail, a charge of 15 cents is made for each question. Special information requiring a large amount of calculation and labor cannot be furnished without remuneration. THE ORACLE has no fixed rate for such work, but will inform the correspondent promptly as to the charges involved.

NAME AND ADDRESS MUST ALWAYS BE GIVEN IN ALL LETTERS. WHEN WRITING ONLY ONE SIDE OF QUESTION SHEET MUST BE USED; DIAGRAMS AND DRAWINGS MUST INVARIABLY BE ON A SEPARATE SHEET. NOT MORE THAN THREE QUESTIONS MUST BE ASKED, NOR SHALL THE ORACLE ANSWER MORE THAN THIS NUMBER. NO ATTENTION PAID TO LETTERS NOT OBSERVING ABOVE RULES.

If you want anything electrical and don't know where to get it, THE ORACLE will give you such information free.

ETHERIC WAVE VELOCITY.

(749.) JAMES SCHAMM, Iowa, says:

Q. 1.—What books can you recommend, which will give the fundamental rules and formulae in Wireless Telegraphy?

A. 1.—Dr. Fleming's book, Etheric Wave Telegraphy; Principles of Wireless Telegraphy by Pierce; Wireless Telegraphy by J. Erskine-Murray.

Q. 2.—What code letters are used for Good-night, Good-morning, Go ahead and Operator?

A. 2.—G. N., G. M., G. A., O. P. R.

Q. 3.—How long does it take a wireless wave to pass around the earth, theoretically?

A. 3.—On an assumption of a wave velocity of 186,000 miles per second, it will take .1344 second for the wave to pass around the earth.

OHM'S LAW.

(750.) SAMUEL CRAMER, Ill., writes:

Q. 1.—What are the three forms of Ohm's Law?

A. 1.—$E = R\,C$; $R = \frac{E}{C}$; $C = \frac{E}{R}$.

Where E = Electromotive-force; R = Resistance, and C = Current.

Q. 2.—Having the Circular Mils area of a wire, how are the sq. mils found?

A. 2.—Multiply the Circular mils by .7854 to find the sq. mils.

Q. 3.—What is the natural period of an aerial 86 feet long?

A. 3.—104 meters.

10 MILE SET.

(751.) LEWIS BOTTOM, Kansas City, Mo., says will you please answer the following questions:

Q. 1.—What outfit is necessary for a ten mile sending and receiving set?

A. 1.—Sending 2½" coil, helix, spark gap, condenser, battery and key, and aerial 50'-60' high. Receiving: same aerial, double slide tuning coil or loose coupler, perikon detector, 2,000 Ohm phones, fixed and variable condensers.

Q. 2.—What is the best kind of aerial to use in this case?

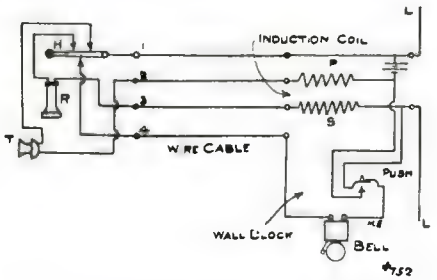
A. 2.—A straightaway, flat top aerial.

TELEPHONE HOOK-UP.

(752.) FRANK WRIGHT, Ohio, writes:

Q. 1.—In the September number, MODERN ELECTRICS, is not the diagram given in answer to query No. 687 (telephone) incorrect?

A. 1.—Yes. The correct diagram is given below.



Q. 2.—What size iron wire should be used in telephone induction coil?

A. 2.—No. 26 to 28 soft iron wire.

Q. 3.—What is the correct air gap in a standard telephone receiver?

A. 3.—1-32 inch between pole face and diaphragm.

RECEIVING RANGE.

(753.) CHESTER LELAND, Holliston, Mass., inquires:

Q. 1.—How far can I receive with the following:

2000 Ohm phones, loose coupled tuning coil; the primary is 6" long and 5½" in diameter and is wound with No. 20 single cotton covered wire, and has one slide; the secondary is movable and has one slide. It is 7" long and 4" in diameter wound with No. 26 single cot-

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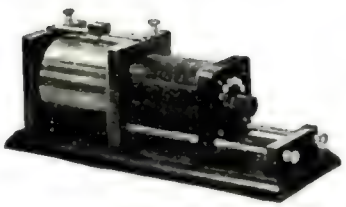

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ton covered wire. Condenser, silicon and peroxide of lead detectors, potentiometer and battery, and 50 foot aerial.

A. 1.—400 miles.

Q. 2.—Would a variable condenser improve the set any.

A. 2.—Yes.

Q. 3.—Where can I get brass pipe for a variable condenser?

A. 3.—Write to the Electro Importing Co., 233 Fulton St., New York.

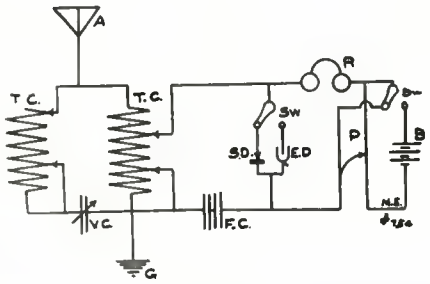
DIAGRAM.

(754.) HERBERT MEYER, W. Phila., Pa., asks:

Q. 1.—Please give diagram for following instruments:

Silicon and electrolytic detectors, one fixed condenser, one semi-variable condenser, 2000 ohm head phones.

A. 1.—See below.



Q. 2.—How far should I be able to receive with an aerial 50 feet long and 50 feet high at both ends.

A. 2.—450 miles.

Q. 3.—Would a fixed condenser made of two strips of foil 50″ long by 4″ wide separated by paraffined paper work with electrolytic and silicon detectors?

A. 3.—Yes.

GROUND.

(755.) LEON R. WESTBROOK, Mass., writes:

Q. 1.—To what should the ground wire which is used to ground the aerial during electric storms be connected; that is, to what object to be buried should it be soldered?

A. 1.—To a water pipe or copper plate sunk in damp earth.

Q. 2.—Is an aerial composed of two strands 125 feet long, three feet six inches apart, too large for a ½″ coil?

A. 2.—It may be used.

Q. 3.—How many sq. inches of tinfoil should be used in a glass plate condenser in the secondary circuit of a ½ inch coil' In a condenser for a 1 inch coil. In a paper receiving condenser'

A. 3.—288 sq. inches; 576 sq. inches; 160 sq. inches, respectively.

WIRELESS BILLS.

(756.) E. K. MCALLISTER, Rochester, N. Y., asks:

Q. 1.—Will you please tell me the gauge number of the enclosed wire?

A. 1.—No. 34 B. & S. gauge.

Q. 2.—What wireless bills have been passed, and where may I secure a copy of them?

A. 2.—None.

Q. 3.—Would wooden blocks act as sufficient insulation for an aerial?

A. 3.—They may be impregnated with wax and used for receiving or low tension work.

SPARK COIL.

(757.) WM. STENGLE, Manheim, Pa., writes:

Q. 1.—How far could I receive with the following instruments:

Silicon detector, double slide tuner, core 12" long and 2" in diameter wound with one layer of No. 22 B. & S. enameled covered wire, a condenser composed of 24 sheets of paper 3" x 4" and 23 sheets of tinfoil 2" x 4", a 75 ohm receiver, aerial 40 feet long and 40 feet high, composed of 4 strands of Aluminum wire spaced 12" apart.

A. 1.—75-80 miles.

Q. 2.—What would be the wave length of the above Tuning Coil?

A. 2.—276 meters.

Q. 3.—Can a jump spark coil be made from a coil having a core 7" long x ½" in diameter? If so, how much and what size wire is to be used on it, and what size spark would it give?

A. 3.—Yes. Primary of 2 layers No. 16 D. C. C. wire. Secondary of 12 oz. No. 36 S. S. C. wire; ¼" spark.

BATTERIES.

(758.) R. S. FISHER, Tacony, Phila., Pa., says:

Q. 1.—Please tell me in MODERN ELECTRICS, if ordinary wet cells coupled to a 6 volt, 60 ampere hour storage battery would work all right.

A. 1.—No. It is bad practice.

Q. 2.—What is my receiving radius with an aerial 57 feet above the ground at one end and 45 at the other; 90 feet long, 4 wires 2 feet apart. Set consists of 2-1000 Ohm Holtzer-Cabot receivers, good loose coupler, fixed condenser and silicon detector.

A. 2.—300-450 miles.

Q. 3.—If I raise my lowest end to a height of say 60 feet, would I be able to send and receive much further.

A. 3.—Yes. 10-15% further.

OPERATING RADII.

(759.) A. VICKERS, Montgomery, Ala.

Q. 1.—How far can I receive with the following instruments and aerial:

Aerial 75' high and 25' long (in and out connections), electrolytic detector, potentiometer, double-slide tuner, variable and fixed condersers, and 2000 Ohm phones.

A. 1.—600-800 miles.

Q. 2.—Could I hear Key West, Fla., 35 K. W. at night?

A. 2.—Yes.

Q. 3.—How far could I send (with the above aerial) with a 1" coil and zinc spark gap?

A. 3.—4-6 miles.

ONE INCH COIL.

(760.) RAY J. NEWTON, Carmel, Ind., asks:

Q. 1.—What is the size of enclosed wire

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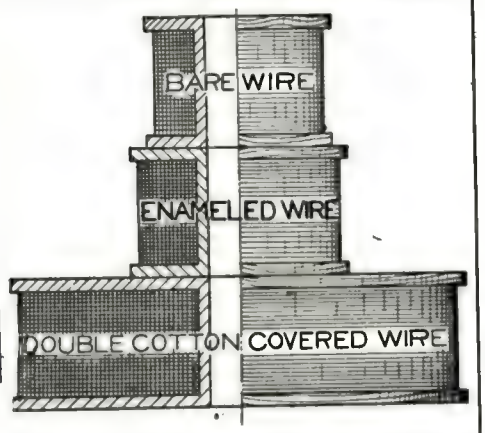

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(Very Sensitive — Permanent Adjustment.)

Adjustable Head Bands, (padded and pivoted.)
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THE HOLTZER-CABOT ELEC. CO.
BROOKLINE, MASS. and CHICAGO, ILL.

When writing, please mention "Modern Electrics."

and give specifications for making a 1" spark coil with this wire for secondary and volts and amperes above coil with take?

A. 1.—No. 29 S. C. C., B. & S. To heavy for 1" coil. See query No. 635, July issue.

Q. 2.—What size and kind of wire is best to use for a ground wire for Wireless.

A. 2.—No. 4 Copper.

Q. 3.—What is the sending and receiving distance with the following:

1 inch coil, glass plate condenser, spark gap, and telegraph key; electrolytic detector, silicon detector, fixed and variable condensers, single silde tuning coil, potentiometer, variometer, 1000 ohm receiver and batteries; using an aerial 75 feet high and 100 feet long for both receiving and sending, and water well ground?

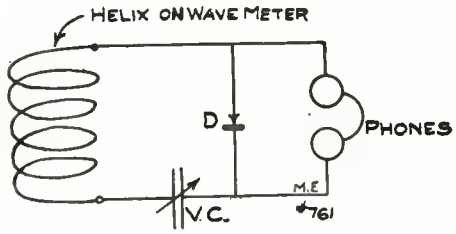
A. 3.—Sending 4-6 miles. Receiving 800 miles.

WAVE METER.

(761.) HENRY CHALMERS, Fla., inquiries:

Q. 1.—I have a "Radio" wave meter and don't know how to connect it. Please give diagram?

A. 1.—Diagram given below.



Q. 2.—What kind of a glow tube is used with the "Fleming Cymometer"?

A. 2.—A glass tube filled with "Neon" gas.

Q. 3.—Is there any instrument that can measure the wave decrement?

A. 3.—Yes: Write to the Marconi Wireless Telegraph Co., 27 William St., New York City.

RECEIVING RANGE.

(762.) L. O. RYAN, Hendersonville, N. C., writes:

Please answer the following questions in the Oracle:

Q. 1.—How far can I receive with a flat top aerial 70 feet high, and 200 feet long, composed of No. 14 Copper wires (6 in number), and 4 feet apart; located at an altitude of 2,250 feet above sea level with no very high hills near; double slide tuner, 3000 ohm receivers, silicon, carborundum and galena detectors; variable and fixed condensers and ground connection in a comparatively deep well just outside of operating room?

A. 1.—800 to 900 miles.

Q. 2.—How far could I send with same aerial and ground with an E. I. Co.'s ½ kilowatt transformer, sending helix, zinc spark gap and good secondary condensers?

A. 2.—80-125 miles.

Q. 3.—Where can I purchase a glass cylinder 7½" in diameter and 12" to 15" long for use in the construction of the rotary variable

condenser described in M. E. for October, 1909?

A. 3.—Write to the Electro Importing Co., 233 Fulton St., N. Y. City.

HOOK-UP.

(763.) W. KELLY, East Nowalk, Conn., asks:

Q. 1.—Please tell me how far I could receive with 2 wire aluminum aerial 40 ft. long and 30 ft. high, auto-detector made from 2 pieces pencil lead, with needle across it, two batteries, 75 ohm receivers, fixed condenser composed of 5 sheets tinfoil 3" x 5" between paraffine paper, and double slide tuning coil wound with 200 turns of No. 22 enameled wire. The core is 4" in diameter and 5½" long.

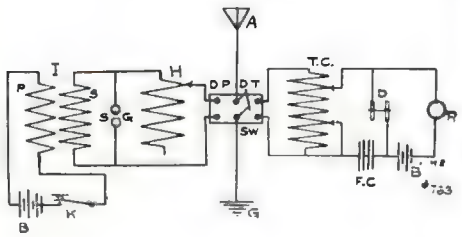
A. 1.—60-80 miles.

Q. 2.—How far could I send with above aerial, ¼" spark coil, sending helix, 4 batteries and zinc spark gap, strap key.

A. 2.—½ mile.

Q. 3.—Please give diagram for sending and receiving.

A. 3.—Diagram given below.



DETECTORS VS. DISCHARGES.

(764.) GEORGE J. RHEIN, Manchtester, Wis., inquires:

Q. 1.—What will be the receiving and sending radius of the following instruments:

A variable condenser, Electro Tuner, No. 8486a of the E. I. Co. Potentiometer, electrolytic detector, 2000 Ohm telephone receivers, fixed condenser, and three dry cells on receiving side; a 2½" induction coil, condensers, key, zinc spark gap, a battery of 8 dry cells, on the sending side. The aerial is 100 feet long and thirty feet high.

A. 1.—Sending 8-10 miles. Receiving 150-200 miles.

Q. 2.—How far can I receive with a Peroxide of lead detector and above named instruments.

A. 2.—10-15% less distance.

Q. 3.—How is an Electrolytic detector effected if a heavy discharge is too near? An auto-coherer? How can they be replaced?

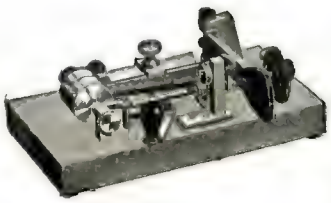
A. 3.—In an electrolytic, the Wollaston wire is burnt off; in the auto-coherer, the grains are burnt or fused. To remedy either replace by new Wollaston wire or new coherer grains.

CONNECTIONS.

(765.) JOHN L. LELAND, Genesco, N. Y.

Q. 1.—Would two galvanized iron wires 20 feet high and at least 250 ft. long do for an aerial?

MECOGRAPH



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A. 1.—Yes; but it will not be as efficient as one of aluminum.

Q. 2.—How far would the following instruments receive with above aerial, E. I. Co., electrolytic detector; potentiometer, 1000 ohm phones, 1500 meter, tuning coil, 1 slide, 3 small fixed condensers and batteries'

A. 2.—150-200 miles.

Q. 3.—Please give diagram of connections.

A. 3.—See query No. 408, December, 1909, issue.

NIGHT AND DAY TRANSMISSION.

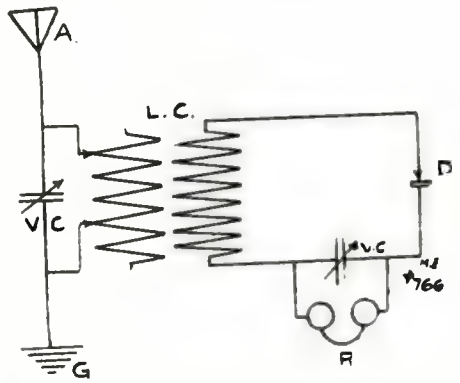
(766.) C. DANIELS, Mass., asks:

Q. 1.—Would you kindly inform me as to the receiving distances with an aerial 25 ft. high, 47 feet long, pair of 1000 ohm phones, perikon detector, 2 variable condensers, and tuning transformer described in May issue?

A. 1.—200 miles.

Q. 2.—Give diagram showing how to connect them.

A. 2.—See diagram below.



Q. 3.—Please tell me why one can send less with the sun shining than at night?

A. 3.—See article on this by Geo. F. Worts in the September, 1910, issue.

OSCILLATION TRANSFORMER.

(767.) F. E. STORY, Poplar Bluff, Mo., asks:

Q. 1.—In your answer to 654 question, No. 3, you give description to make a sending transformer for Wireless telephone. Can I use this for Wireless telegraphy, and if so give diagram to connect up with condensers, etc.

A. 1.—Yes, but make the primary 11½" in diameter. For connection see answer to query No. 690, in September, 1910, No

AERIAL CONNECTIONS.

(768.) L. S. U., Schenectady, N. Y., writes: Kindly answer the following questions:

Q. 1.—I have an eight wire horizontal flat top T aerial 30 feet long and 50 ft. from the ground and I intend to use a one and one-half inch spark coil and a sending helix. What would be the best way of connecting the wires together for all around work? Please give diagram.

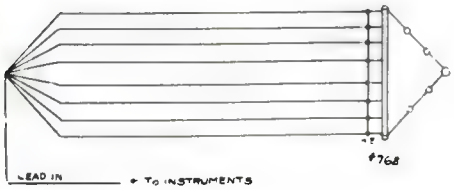
A. 1.—Diagram is given below.

Q. 2.—What would the wave length of the above mentioned aerial be?

A. 2.—97 meters.

Q. 3.—If used with the above mentioned spark coil would it interfere with Government stations?

A. 3.—No.



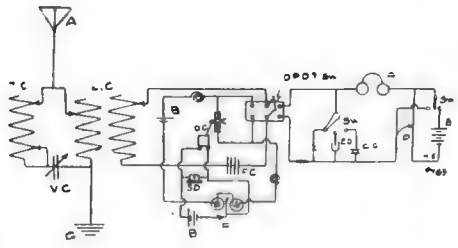
RECEIVING CONNECTIONS.

(769.) FRANK L. TYREE, JR., Charleston, W. Va., writes:

Q. 1.—Give diagram how to connect up the following instruments:

Electrolytic, silicon and peroxide of lead detectors. Loose coupler single slide on primary and secondary, double slide tuner, 2000 ohm phones set, potentiometer, battery, fixed condenser, variable condenser, precision coherer, 150 ohm relay, telegraph sounder, 2 choke coils. Give diagram so as to use tuner in connection with coherer. Use as many switches as needed in this diagram.

A. 1.—Diagram given below.



CODES.

(770.) B. M., Md., asks:

Q. 1.—What code do they use at the Clark 15 K. W. Wireless Station C. B. at Buffalo?

A. 1.—Morse code.

Q. 2.—Would two seventy ohm receivers be better than one to receive?

A. 2.—Yes.

Q. 3.—What codes are used on big ships on the Atlantic Ocean?

A. 3.—Morse and Continental.

SILICON DETECTOR.

(771.) ROBT. MIRGELER, Milwaukee, Wis.:

Q. 1.—Please tell me how to make a silicon detector to be used without battery or potentiometer. I am using E. I. Co. tuning coil, 2 slides.

A. 1.—See pp. 327, September M. E.

2 K. W. TRANSMITTER.

(772.) FRANK KOCH, San Francisco, Cal.:

Q. 1.—Please give diagram for connecting a double slide tuning coil, silicon, auto-coherer, peroxide of lead, and electrolytic detectors and

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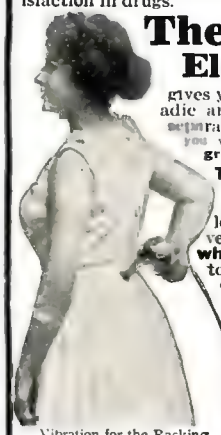

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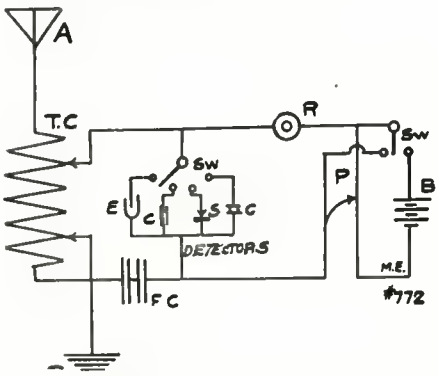
A. 1.—Diagram given below.



Q. 2.—How far can I receive with same?

A. 2.—80 to 100 miles.

Q. 3.—How far can I send with a 2 K. W. transformer using same aerial?

A. 3.—150-250 miles.

SPARK COILS IN SERIES.

(773.) ARCHIE MCKINZIE, Jackson, Mich., says:

Q. 1.—Can I connect two or three one-inch spark coils in series to obtain a two or three inch spark on battery current?

A. 1.—Yes.

Q. 2.—Can I use the vibrator on one of the coils with the other vibrators screwed up, or will I have to use a separate vibrator?

A. 2.—Use one vibrator only, and screw the others up tight.

Q. 3.—Will I have to increase the number of storage batteries in proportion to number of coils used, as follows:

If I use 3 type R. E. storage cells, will I have to use 6 cells with two one inch coils?

A. 3.—Yes.

BOSTON STATIONS.

(775.) L. C. ALDRICH, Keene, N. H., writes:

Q. 1.—Please answer the following questions:

How far can I receive with the following outfit: Aerial 3 wires, 300 feet long and 56 feet at one end, and 12 feet at the other, spaced 4 feet; loose coupled tuner, having 500 feet, No. 30 B. & S. wire on secondary, and 100 feet No. 18 on primary, 500 ohm potentiometer, fixed condenser, detectors, peroxide lead, carborundum and silicon?

A. 1.—Up to 400 miles.

Q. 2.—Are there any stations (Govt. or public) near me that I can hear? I am about 96 miles from Boston.

A. 2.—Yes. Several large ones in Boston, also Cape Cod and Wellsfleet.

Q. 3.—How much further can I receive if I use 1,000-ohm phones?

A. 3.—About 30%.

TUNING COIL WAVE LENGTH.

(774.) RAYMOND GRIEP, Carthage, Mo., says:

Q. 1.—How many meters on a tuning coil

four inches in diameter having 400 turns of No. 22 wire on it.

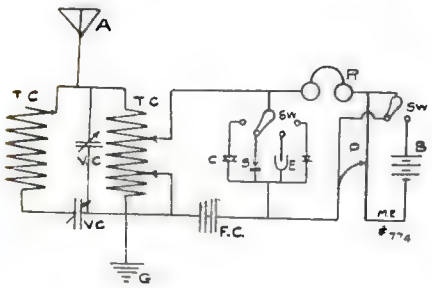
A. 1.—668 meters.

Q. 2.—I have a wireless set with four detectors silicon, electrolytic, peroxide of lead and carborundum, a tuner as above with an auxiliary tuner, variable, adjustable and two fixed condensers, potentiometer with batteries, and 2 75-ohm pony receivers with head band. The aerial is composed of four wires, forty feet long and two feet apart. It is 65 feet high at one end and 30 feet at the other. How far can I receive under good conditions?

A. 2.—100 miles.

Q. 3.—Please give diagram of the set described?

A. 3.—Diagram below.



½ INCH SPARK COIL.

(776.) G. KHEUNE, Guyandotte, W. Va.:

Q. 1.—How much and what size of wire will it require to make a ½" induction coil, and what size core?

A. 1.—Core 6" x ½". Primary 2 layers No. 19 D. C. C. Secondary ¾ lbs. No. 36 S. S. C. Condenser 50 sheets tinfoil 4" x 2".

Q. 2.—Is there any danger of injuring an E. I. Co's. 2-inch coil on 110 volts using the Gernsback interrupter?

A. 2.—No.

Q. 3.—Is phosphor bronze wire better for an aerial than aluminum?

A. 3.—Yes.

PARAFFINED PAPER.

(777.) E. CRAMER, Martinsville, Ind., says: Please answer these questions:

Q. 1.—What kind of paper can I make paraffined paper of, and how can I make it?

A. 1.—White bond paper, immersed in hot paraffine until the bubbles cease to rise.

Q. 2.—How many meters wave length will an aerial respond to, 4 wires 90 ft. long, in connection with a tuning coil made of 1 lb. of No. 24 enameled wire?

A. 2.—1,000 meters.

Q. 3.—How many sheets of tinfoil and what size make a good receiving condenser?

A. 3.—See query No. 514 in April 1910 M. E.

5 MILE SET.

778.) BRONSON WEED, Ohio:

Q. 1.—I have a 2,000-meter double slide tuner, silicon and carborundum detectors, fixed condenser, a variable condenser (tub-

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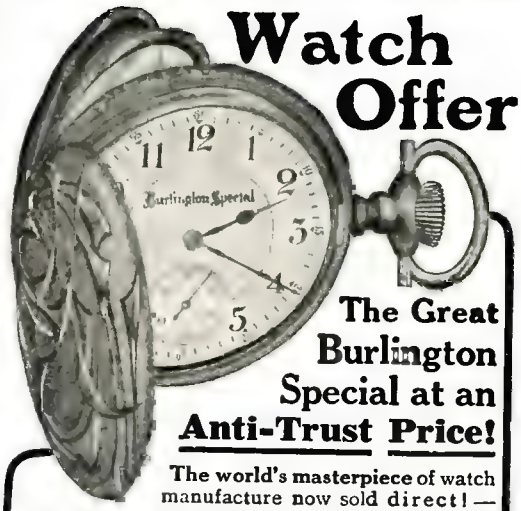

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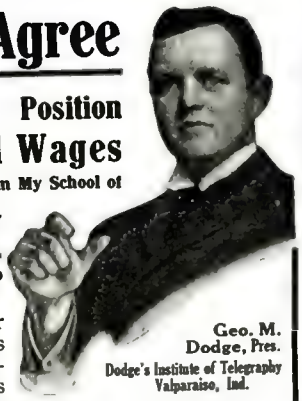

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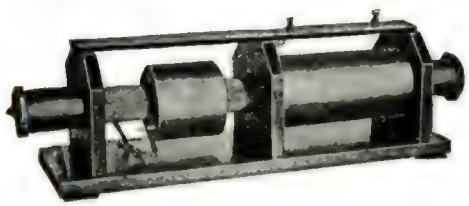

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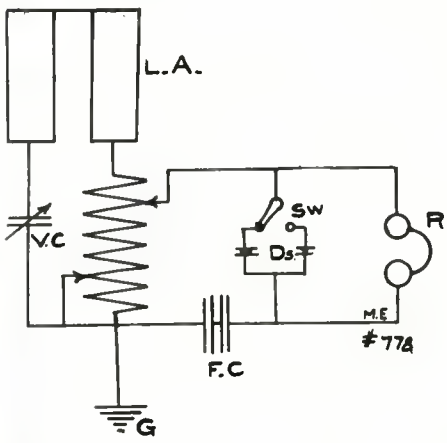
ular type) 2,000-ohm phones and a loop aerial 50 ft. long, 40 to 50 ft. high from ground. Please state the farthest possible distance that could be covered with this set.

A. 1.—300-500 miles.

Q. 2.—How can I connect the above to get best results?

A. 2.—See below.



Q. 3.—What would be considered a good sending set to send 5 miles?

A. 3.—1½" spark coil, spark gap, condenser, and helix.

WAVE LENGTH.

(779.) H. A. Bartlett, Watertown, Mass., inquires:

Q. 1.—How far could I receive with an aerial 95 ft. high of 6 wires 2 ft. apart and 150 ft. long. A doughnut transformer of 1,500 meters, 2 variable condensers and a fixed condenser, perikon detector, potentiometer, and two 1,000 ohm receivers?

A. 1.—800-1,200 miles.

Q. 2.—Will you also tell me how many meters will 10 turns of No. 28 bare copper wire give when wound on cardboard tube 5 in. in diameter, and how many meters will 10 turns of No. 24 bare copper give, wound on cardboard tube 4 in. in diameter?

A. 2.—16 meters and 13 meters respectively.

TRANSFORMER COIL OPERATION.

(780.) A. G. Brown, St. Louis, Mo.

Q. 1.—How far can I send with the following instruments: Four strand aerial 10 to 40 ft. high and 70 ft. long, helix 15 turns No. 6 B. & S. aluminum wire, condenser 8 plates foil 12 by 18 coated on both sides, E. I. Co.'s ½ K.W. transformer coil (110 vts. 5 ampere 60 cycle alternating current)?

A. 1.—40-50 miles.

Q. 2.—Do you have to use an interrupter to work with the E. I. Co.'s ½ K.W. transformer-coil using above voltage? If so, why?

A. 2.—Yes: As it is not wound for 110 Vt.

Q. 3.—Will No. 6 phosphor-bronze wire do for an aerial?

A. 3.—Yes.

1 K. W. TRANSFORMER.

(781.) CLAYTON BONDETTE, Everett, Wash.: Q. 1.—Kindly give me data through the "Oracle" of the MODERN ELECTRICS for a 1 K.W. transformer having a closed core to work on the 110 vt., 60 cycle alternating current.

A. 1.—Core 15x8¼ in., size opening 11x4¼ in.; Primary of 344 turns of No. 10 B. & S. D. C. C. magnet wire, secondary of 11 lbs. No. 32 B. & S. D. C. C. wire wound in 24 pancakes of 1,611 turns each Bring out taps from each layer of the primary so that the current may be varied.

Q. 2.—Please furnish diagram for connecting same with helix, key, condenser and spark gap.

A. 2.—See query No. 567, May issue.

SENDING RANGE.

(782.) SAMUEL F. TYLER, Newton, Mass., inquires:

Q. 1.—How far can I receive with the following instruments: 1,500 meter tuning transformer with double slide on primary and one slide on secondary, fixed condenser, 1,000 ohm receivers, silicon and perikon detectors (having zincite and bornite for minerals) and 45 foot umbrella aerial with 8 wires and 1 in. pipe for pole?

A. 1.—300-400 miles.

Q. 2.—How far could I send with the following instruments: 1½ in. spark coil. helix of primary and secondary type, wound with ¼ in. and ½ in. copper ribbon on a 10 in. drum, spark gap and condenser, 6 plates 10x7 in., also key and 8 dry batteries with above aerial?

A. 2.—3-6 miles.

Q. 3.—How much would it increase my receiving range with a pair of 2,000 ohm receivers and a variable condenser?

A. 3.—20 to 30 per cent. increase in receiving radius.

SENDING RADII.

(783.) CHAS. WARD, JR., N. J., asks:

1.—What is the receiving radius of my set, consisting of silicon detector, electro tuner, junior, double slide, pair of 75-ohm receivers, double-pole type, aerial made of 4 strands of aluminum No. 14 gauge, 16 inches apart, 30 feet long and 30 feet high?

A. 1.—Your receiving radius will be from 50 to 75 miles.

2.—How far can I send with above aerial and 1½-inch spark coil?

A. 2.—From 6 to 8 miles, if you use tuned circuit.

A.—Would a transmitting helix improve my set any? If so, how much?

A. 3.—Yes. If you use transmitting helix, condenser and zinc spark gap, your sending efficiency will be increased about 50 per cent.

HOT WIRE AMMETER.

(784.) L. I. DENNISON, Mich., inquires:

1.—I do not get a shock when I put my hand on the aerial and ground wires. Is this a sign of wrong connection?

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TYPEWRITING BY WIRE

[Continued from page 432]

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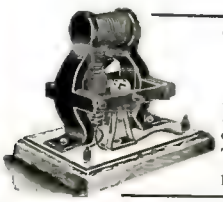

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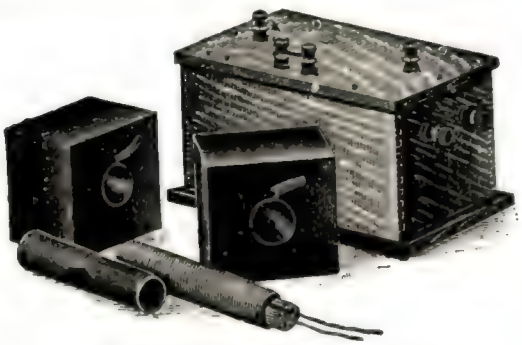

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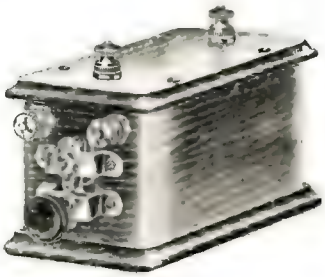

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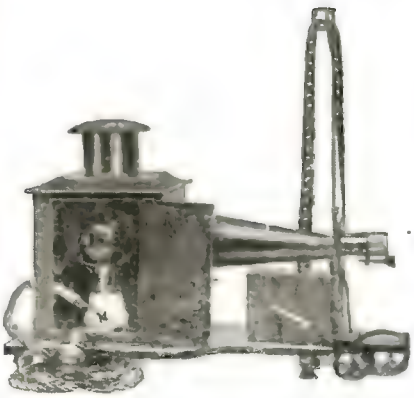

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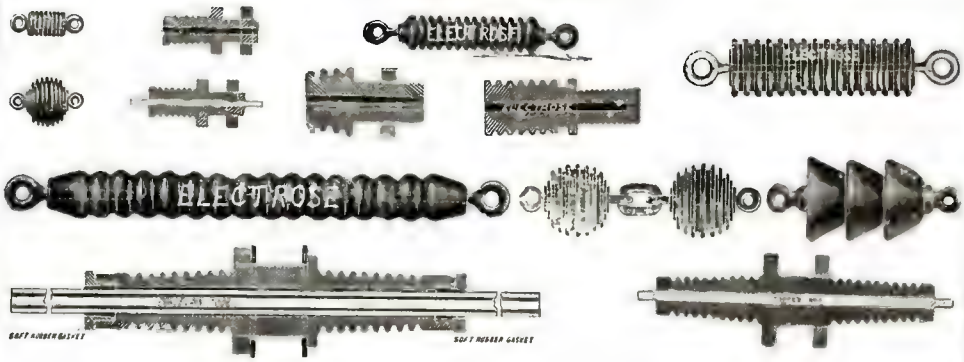

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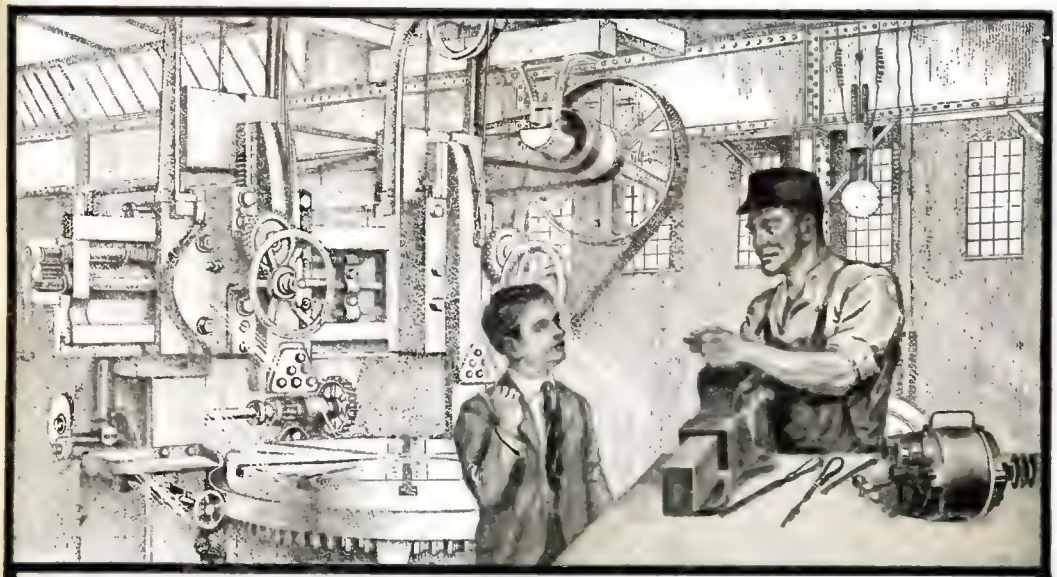

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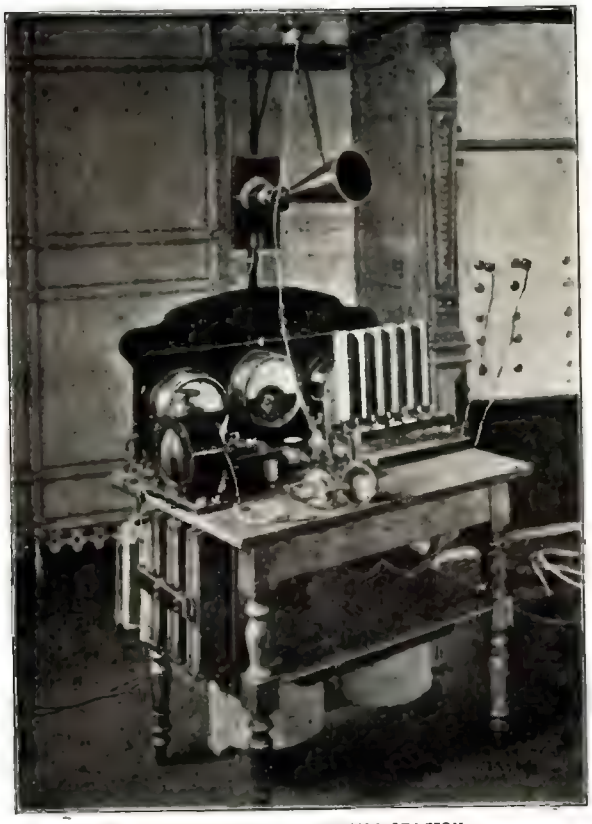

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MODERN ELECTRICS PUBLICATION

233 Fulton Street, NEW YORK CITY

Wireless Association of America

THE Wireless Association of America has been founded with the sole object of furthering the interests of wireless telegraphy and telephony in America.

We are now on the threshold of the wireless era, and just beginning to rub our intellectual eyes, as it were. Sometimes we look over the wall of our barred knowledge in amazement, wondering what lays beyond the wall, as yet covered with a dense haze.

However, young America, up to the occasion, is wide awake as usual.

Foreign wireless experts, invariably exclaim in wonder when viewing the photographs appearing each month in the "Wireless Contest" of MODERN ELECTRICS. They cannot grasp the idea that boys 14 years old actually operate wireless stations successfully every day in the year under all conditions, but they are all of the undivided opinion that Young America leads the rest of the world wirelessly.

So far America has led in the race. The next thing is to stay in the front, and let others follow. In fact he would be a bold prophet who would even dare hint at the wonders to come during the next decade. The boy experimenting in an attic to-day may be an authority to-morrow.

As stated before the Wireless Association's sole aim is to further the interests of experimental wireless telegraphy and telephony in this country.

Headed by America's foremost wireless men, it is not a money-making institution. There are no membership fees, and no contributions required to become a member.

There are two conditions only. Each member of the Association must be an American citizen and MUST OWN A WIRELESS STATION, either for sending or for receiving or both.

The Association furnishes a membership button as per our illustration. This button is sold at actual cost. Price 20 cents (no stamps nor checks).

This button is made of bronze, triple silver-plated. The flashes from the wireless pole are laid in hard red enamel, which makes the button quite distinctive. The button furthermore has the usual screw back making it easy to fasten to buttonhole. The lettering itself is laid in black hard enamel. Size exactly as cut.

On account of the heavy plating it will last for years and is guaranteed not to wear "brassy." Beautiful solid gold button, $2.00.

Its diameter is 3-4 inch. This is a trifle larger than usual, the purpose being to show the button off so that it can be readily seen from a distance. The reason is obvious. Suppose you are a wireless experimenter and you live in a fairly large town. If you see a stranger with the Association button, you, of course, would not be backward talking to the wearer and in this manner become acquainted with those having a common object in mind, which is the successful development of "wireless."

The Association furthermore wishes to be of assistance to experimenters and inventors of wireless appliances and apparatus, if the owners are not capable to market or work out their inventions. Such information and advice will be given free. Somebody suggested that Wireless Clubs should be formed in various towns, and while this idea is of course feasible in the larger towns, it is fallacious in smaller towns where at best only two or three wireless experimenters can be found.

Most experimenters would rather spend their money in maintaining and enlarging their wireless stations, instead of contributing fees to maintain clubs or meeting rooms, etc., etc.

The Board of Directors of this Association earnestly request every wireless experimenter and owner of a station to apply for membership in the Association by submitting his name, address, location, instruments used, etc., etc., to the business manager. There is no charge or fee whatever connected with this.

Each member will be recorded and all members will be classified by town and State.

Members are at liberty to inquire from the Association if other wireless experimenters within their locality have registered. Such information will be furnished free if stamped return envelope is forwarded with inquiry.

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SPECIAL.—As seen above, the Association Button is sold for 20 cts. usually. Up to December 15th we will accept 15 cts., coin or stamps, for this beautiful button. This is a special offer, and will positively not be made again.

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All the insulating parts of the instrument are made of moulded hard rubber which makes it the most attractive apparatus of this sort ever placed on the market. Size over all, 4 x 1½ in.; weight four ounces.

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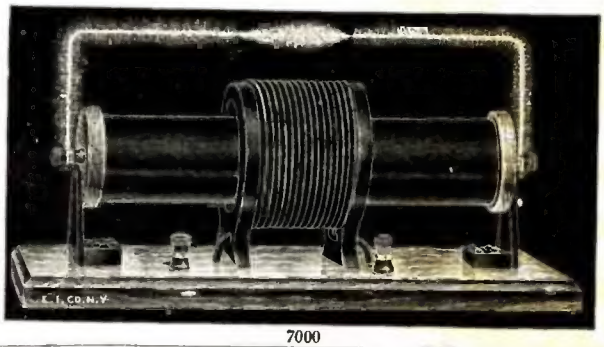

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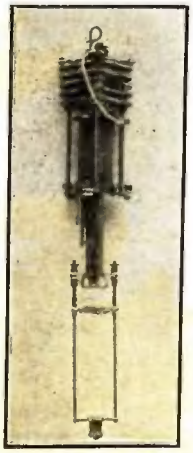

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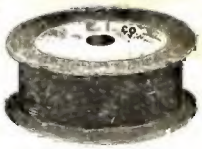

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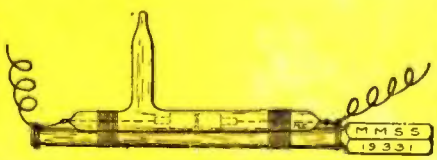

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